THE WOAD PLANT AND ITS DYE

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PLATE I

Central figures, plants of woad (reduced). *To left*, ripe pods, and one open to show seed (nat. size). *To right*, a flower (enlarged) to show structure. JOAN BORRETT, *del.*

THE WOAD PLANT AND ITS DYE

BY THE LATE
JAMIESON B. HURRY
M.A., M.D.

With Illustrations

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FOREWORD

They serve God well,
Who serve his creatures.
(*The Lady of La Garaye.*)—MRS. NORTON.

BEFORE Dr. Hurry died, whilst he was actively engaged in the preparation of this valuable work on Woad, he expressed a wish that, should he not live till it was published, I would see it through the press. I had high hopes that I might never be called upon to perform this task. But, alas! How frail are our hopes, how frail the human frame!

Dr. Hurry was one of those men who, released from professional duties, dedicate their lives to others, and he sacrificed much of his leisure in rendering further service to his fellows, by the accumulation of a vast store of valuable and interesting information for publication. This was always prepared with the same skill and patience, i.e. that of the careful monographer, and resulted in works that must have lasting value. For Dr. Hurry always brought exhaustive research to bear upon every subject he handled, treating it in a manner unique and attractive to all classes of readers, whether studious or dilettante. Each of his works further is illumined by brilliant and original conceptions, for he was never a mere compiler but a man of high intellect and imagination.

In this labour of love Dr. Hurry forgot himself, and drew too generously upon his physical powers, so that latterly he suffered such ill health that most men in his place would have laid work aside. Not so my dear friend, who until a few days, nay hours, before he died was engaged as actively as ever, in arranging with the

Publishers for the issue of this work, and in putting final touches to the book. My task indeed has been a light one, for Author and Publisher have left me little to do, and whilst a sad one in that I miss (in company with many) the genial kindly friendship of the writer, I am at least happy in obeying one of his last wishes.

In the Biographical Sketch by Mr. Dawson the Author's devotion to others will be shown by the wide sphere of his activities, and I need only add—though scarcely necessary—that all who read this posthumous work will realize at once how much this world has lost by his passing on to higher service.

A. R. HORWOOD.

J. B. Hurry.

JAMIESON BOYD HURRY, 1857–1930

MEMOIR OF JAMIESON BOYD HURRY

JAMIESON BOYD HURRY, son of the Rev. Nicholas Hurry of Liverpool, was born on the 8th June, 1857. He was educated, first at Neuchâtel, Switzerland, and afterwards at the City of London School, from which he passed to St. John's College, Cambridge, with which so many great names in science and literature are associated. Hurry from boyhood had the taste and an exceptional capacity for medicine. In 1882 he graduated M.B. at Cambridge, and in the same year obtained his diploma as a Member of the Royal College of Surgeons of England. On leaving Cambridge, Hurry completed his medical education at St. Bartholomew's Hospital, where he became resident obstetric physician under James Matthews Duncan, who since 1877 had been senior obstetric physician to the hospital. It has just been said that at Bart's Hurry 'completed' his medical education: it was there completed merely in the academic sense, for Hurry himself held that in so progressive a science as medicine, education must never cease. All his life he followed the progress of medical science with studious care, and to the day of his death kept in close touch with current medical literature and with his active professional colleagues.

On leaving the hospital, Hurry's first appointment was that of Ship's Surgeon, and in the course of a year he had travelled to Australia, India, and South America, and thus acquired the taste for travel that he was able to gratify in later years. Hurry's travels were not those of an idle tourist. During his visits to America, Egypt, Morocco, and almost every corner of Europe, he sowed

the seeds that bore fruit in his later works. He took a keen interest in medical schools, in sociological problems, in medical and economic botany, in history and archaeology, and he was thereby enabled to treat the many topics on which he afterwards wrote with a singularly broad and catholic outlook.

Before passing on, it may here be recorded that at Cambridge Hurry graduated B.A. in 1879, with honours in the Natural Science Tripos, took the M.B. in 1882, and was admitted M.R.C.S. in the same year, as already noted. In 1884 he became D.P.H. and took his M.A. degree, M.D. in 1885, and B.Ch. in 1890.

Thus equipped with academic qualifications, but still more highly endowed with energy, enthusiasm, and ability, Hurry settled after his term as Ship's Surgeon to medical practice in Reading in 1885, where he entered into partnership with the late Mr. George May, F.R.C.S.

In Reading almost the whole of his active life was spent, for he remained there until 1926. To Hurry's kindness, skill, and sympathy as a medical practitioner many past and present residents of Reading could abundantly testify. He was, as will be seen in the sequel, a man of many interests and tastes, but he never allowed either his studies or his intellectual relaxations to encroach upon his professional cares.

The name of Jamieson Hurry is particularly associated with a remarkable series of works on Vicious Circles—the evil that begets evil—in various phases of medicine and sociology. He wrote a number of monographs in which he clearly brought out the interaction and reflex action of causes and effects. *Vicious Circles in Disease*, the first of these monographs, appeared in 1911, reached a third edition in 1919, and was translated

into French, Spanish, and Italian. *Vicious Circles of Neurasthenia and their Treatment* and *Vicious Circles in Sociology* followed in 1915, and two years later appeared *Poverty and its Vicious Circles*, which reached a second edition in 1921, and has been translated into French, Italian, Japanese, and Chinese.

It was characteristic of Hurry that every subject in which he became interested was forthwith made the object of deep study and reflection. His critical and logical methods of handling his themes are familiar to all readers of his books, but in addition he had a mind of singular clarity and originality. It did not satisfy him merely to state a case, or to direct attention to some anomaly or defect that called for amendment; his fertile brain had always a remedy to suggest, and his attractive and polished literary style lent charm to every subject he handled. Thus, when in the course of his professional work he was frequently in contact with the problems of nursing, he did not merely grumble at the defects in the current methods of the time, he studied their causes and proposed remedies, many of which have with profit become generally adopted, and his *District Nursing on a Provident Basis* (1898) was welcomed and widely read. Similarly his association with various scientific and medical societies led him to examine their structure and functions, and he published as a result *The Ideals and Organization of a Medical Society* (1913).

Reading is the home of one of the oldest medical societies in this country—the Reading Pathological Society. During the whole of his long residence there, Hurry was an active and helpful member of that body, and was its president from 1907 to 1910. He was deeply impressed with the potentialities of such societies, and

his special interest in that of his own town caused him to seek out and record the story of its past. Thus in 1909 he published his *History of the Reading Pathological Society*.

History was a subject that had great charms for Hurry. His wide literary knowledge, his great experience in travel, his meticulous and industrious habit of note-taking, all conspired to make him an ideal historian —an historian of the type that can animate the past and can cause ruins, charters, and dusty records to reveal their secrets of busy life and human emotion. He took the keenest interest in Reading Abbey—now shorn of its glory and reduced to shapeless ruins, but once one of the most considerable monastic foundations of this country. In 1901 he published his *Reading Abbey*, an attractive and well-illustrated volume. It deals not only with the archaeology and architecture of the building, but conjures up a vivid picture of the daily life in that venerable Monastery, before religious and political persecution and the relentless hand of time had gripped it and closed its life for ever. There is no phase of the history and antiquities of the Abbey that is not fully dealt with: its history is detailed in chronological sequence, its endowments and privileges, its role in the social and religious life of the town, its seals, charters, coinage, relics, and library, and its fate after the Dissolution, are all fully dealt with and endowed with animation and interest. But this book is not the only one concerned with the Abbey and town that Hurry's pen produced. In 1906 appeared his *Rise and Fall of Reading Abbey*, and this was followed by *King Henry Beauclerc and Reading Abbey* in 1919, and by *The Trial by Combat of Henry de Essex and Robert de Montfort at*

Reading Abbey in 1919, and by *The Octocentenary of Reading Abbey* in 1921. Every Whit-Monday for many years Hurry was wont to conduct a large party of his fellow-townsmen through the ruins of the Abbey, when the now famous canon 'Sumer is icumen in' was sung. Of this charming piece of mediaeval prosody Hurry published an illustrated edition with musical notation in 1913.

But of all Hurry's activities in connexion with stimulating an interest in the historic past of the Abbey and town, the most notable is his gift of a series of ten paintings illustrating episodes in the history of the Abbey which he presented to the town and which are now displayed in the Reading Municipal Art Gallery. The paintings are of high merit, and most of them were exhibited at the Royal Academy.

There were many other services that Hurry rendered to Reading. He was honorary consulting librarian of the Reading Pathological Society from 1915, was a keen member of the Council of Reading University, and a Justice of the Peace for the Borough.

At 'Westfield', his residence, he gave expression to one of his hobbies in establishing an educational garden, where he assembled from all parts of the world tropical and economic plants, especially those that yield food, fibre, dyes, medicines, and industrial material for the service of man. Here also he established a museum of the products of such plants. The botanic garden and museum, freely placed at the disposal of all intelligent visitors, attracted many comers from far and near. A catalogue and handbook, written with characteristic lucidity, enhanced its value. After Hurry's removal from Reading he presented the collection of plants to

the Corporation of Bournemouth, where it is now housed and cared for in the King's Park Nurseries at Boscombe.

Hurry's life-long interest in economic botany found its last expression in the admirable monograph of the history and use of Woad, which he had practically completed and which was actually in the printer's hands at the time of his death.

Medical history was another subject which had great attractions for Hurry. To this subject he made a notable contribution in the last work published during his lifetime—*Imhotep, the Vizier and Physician of King Zoser and afterwards the Egyptian God of Medicine*. It was in connexion with this work that the present writer came into close contact with Hurry, and was enabled to see at first hand the depth of his learning and the kindness and geniality of his character.

Hurry entered a new field in the preparation of this book—Egyptology. He had acquired in a short space of time a truly wonderful appreciation of the records and achievements of the ancient Egyptians, and had explored far and wide the vast and technical literature of Egyptology. When the second edition of the book was in preparation Hurry discussed with the writer of this memoir every detail of the book, and submitted it to him both in manuscript and proof. As most of the collaboration had necessarily to be carried out at a distance, a voluminous and delightful correspondence ensued. Hurry's deep but unostentatious learning, his sincere and kindly expressed gratitude for the least help received from others, are manifest in all his letters. He visited London from time to time in order to consult books in the British Museum or other libraries, and on

most of these occasions plans, ideas, and details of production were fully discussed with the writer. In this, as in all his books, Hurry spared neither time nor expense in ensuring that the ultimate publication should be both intellectually and physically as near his ideal as he could make it. He was insistent that the Architecture of a book, as he termed it, was quite as important as its subject-matter, and he paid most careful attention to the classification of the chapters and paragraphs, to the placing of the illustrations, to their material production, and to the index. He did not shrink from trouble or expense in carrying out these ideals. Since Hurry's death the writer has seen his private notes and papers, as well as his correspondence in connexion with *Imhotep*: these convey an idea of the painstaking and meticulous care that he lavished upon the publication of a book. Of him it may be truly said *Omne quod tetigit, ornavit.*

Of Hurry's domestic life none but a member of his family is entitled to speak: it was, indeed, singularly happy. He married in 1892 Gertrude Louisa, daughter of the late Arthur Hill, J.P., of Erleigh Court, Reading, a niece of Miss Octavia Hill, whose name goes down in history as one of the greatest philanthropists and sociologists of her age. In 1926, both Hurry and his wife being in impaired health, he gave up his home in Reading and removed to Bournemouth. Even in his last years, in spite of suffering and great physical disability, he was always cheery and optimistic in disposition: his smile and genial manner never forsook him to the last. He had boundless stores of encouragement and helpfulness for all who came to him, and his never-failing courtesy was justly appreciated by all he met. If

those around him were apt to be disheartened, some cheering words were always ready: 'Look on the bright side, the sun is always there behind the clouds', or 'Have music in your heart'. These were not mere sententious formulae: they mirrored the deepest feelings of his heart. He was especially fond of young people, helping them alike in work and play, and always ready to encourage them in their hobbies, natural history being especially near his heart. Although his principles were of the strictest, he had the fullest sympathy with the views of others, and always took a broad-minded and non-contentious attitude in controversial subjects.

Hurry's modest and unostentatious nature would shrink from any elaboration of the numerous and generous gifts that he bestowed upon societies and institutions. In deference to his own wishes, therefore, no details will here be given (although many are known to the writer), but it must be recorded that at Cambridge Hurry founded the Michael Foster Research Studentship, and it is characteristic of him that his own munificence goes down to posterity, not in his own name, but in the name of another.

Jamieson Hurry passed away somewhat suddenly on the 13th February 1930 at 'Hinton Firs', Bournemouth. He was laid to rest at Boscombe Cemetery.

The deep sorrow that his death has inevitably caused to his wife, his son, and his daughter, will be tempered in some measure by the memories they will ever cherish of a loving and considerate husband and father, and they and his many friends will be cheered by the thought of a noble life of service to his fellow-men.

And in conclusion, the writer of this brief memoir must be permitted to speak in the first person. At

Mrs. Hurry's request I have written this sketch of the life of a man whom I am proud to recall as one of my dearest friends. The fulfilment of this request has been a sincere gratification to me, and I make this little tribute to the cherished memory of an unselfish worker in the service of others, a true scholar, a skilled doctor, and a kind and gentle friend.

WARREN R. DAWSON.

PREFACE

THIS volume is an attempt to tell the story of the *Isatis tinctoria* or Woad plant, and of the famous blue dye derived from its leaves. The subject will be studied not from a national but from an international point of view, the special characteristics of the woad industry in such countries as England, France, Germany, and Italy coming under consideration. No such comprehensive review of the industry has yet been published.

Apart from its reputation as the source of a dye, woad is of extraordinary interest from the historical, botanical, agricultural, medical, economic, philological, and other points of view, and these aspects will receive attention in the following pages, in the hope that the survey may contribute to our knowledge of the social and industrial life of the Middle Ages, more especially in those countries where the plant was cultivated on an extensive scale.

In the course of the following study numerous illustrations will be met with of peculiar doctrines of political economy, of the narrow outlook of mediaeval commerce, and of the severity of punishment in the olden times. Of special interest is the bitter struggle for supremacy waged between the respective champions of the home-grown woad and of the exotic indigo, a struggle from which much may be learned by readers interested in the economics of the Middle Ages. Many isolated fibres have been drawn together and woven into a connected canvas, on which has been drawn a portrait of the woad industry as true to life as possible.

The author is well aware of the shortcomings of the volume, which is by no means an exhaustive study.

There is room for fuller treatment of the subject by an expert with leisure to study in detail the historical archives, both national and municipal, in those countries in which woad formed an important commodity. Florence especially possesses precious documents that have not yet been examined in detail.

The pleasant duty remains of thanking those friends who have given generous assistance in the compilation of this volume. Dr. Rendel Harris has generously placed his accumulated notes at the author's disposal. Dr. A. W. Hill, Director of the Royal Botanic Gardens at Kew, has permitted the inclusion of an account of the specimens of woad in the Herbarium at Kew. Mr. S. J. Crawford has given valuable assistance in connexion with its Philology. Dr. H. N. Ridley has contributed a valuable note on the evolution of woad. Prof. Percival has supplied a Plate showing its chromosomes; Sir Rowland Biffen has supplied Pls. IV, VII, VIII (*a*, *b*), X. Mr. L. E. D. Barber has contributed the Chapter on The Taxation of Woad and the various Maps showing the Woad Districts and the Trade Routes of Woad. Amongst others also Miss M. Blassneck, Messrs. A. H. Davis, P. Dubois, T. H. Hirst, and J. L. Nussey should be warmly thanked for assistance rendered.

A special acknowledgement is due to Mr. A. W. Exell and Mr. A. R. Horwood, who have been ungrudging of their time in assisting the author in many directions.

The sources of the Illustrations are acknowledged in the list of plates on page xxiii.

J. B. H.

HINTON FIRS,
MANOR ROAD,
BOURNEMOUTH.

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INTRODUCTION

A FEW words will suffice as an introduction to this study of 'The Woad Plant and its Dye'. The subject takes us back to early times, when the plant yielded a dye which was found attractive as well as useful in the eyes of our ancestors, one which has filled a place in history during the many intervening centuries.

Woad, by means of the woad vat, contributed what was regarded as the fashionable colour during the Middle Ages, and formed an important commodity from the point of view of national and international commerce. Large supplies were imported into Great Britain from France, from Italy, and from Germany.

The *Isatis tinctoria* has, moreover, done much more than benefit humanity by supplying a popular colour for its clothes. It has brought economic prosperity to many communities. It has found a place on the artist's palette. It has been widely employed both in medical and in surgical therapeutics. Its greatest service to human welfare, however, has come through its influence on agriculture, an influence so potent as to justify woad being called a 'pillar of civilization'.

The important place formerly occupied by woad as a famous dye has now been filled by other commodities, more especially by exotic and by artificial indigo. But so long as history endures, its services will be held in grateful and everlasting remembrance.

CHAPTER I

THE PLACE OF WOAD IN THE VEGETABLE KINGDOM

IT will be convenient to deal with the subject of this chapter under the following headings:

A. DESCRIPTION OF WOAD.
B. ECOLOGY.
C. EVOLUTION.
D. ORIGIN AND DISTRIBUTION.

A. DESCRIPTION OF WOAD

Woad, *Isatis tinctoria*, is a biennial or perennial herb (Frontispiece), with an erect stem, bearing yellow flowers and borne on short racemes arranged in corymbose panicles. It belongs to the *Cruciferae*, a family of flowering plants which derives its name from the cruciform arrangement of the four sepals and petals of the flower. The root is woody and fusiform, and penetrates 12–18 inches into the ground. The stem, two to five feet high, is glabrous and glaucous, sometimes with a few hairs on the lower part. The flowering stem is branched above; in shape the radical leaves are ovate or lanceolate, and stalked. The stem leaves are sessile and sagittate at the base, the lower ones oblong-lanceolate or lanceolate. At the ends of the branches are numerous crowded corymbs of yellow flowers, the latter measuring about one-sixth of an inch across. The sepals are yellow; the petals, also yellow and narrowly oblanceolate, are twice as long as the sepals. The flowers are regular with four free sepals arranged in two pairs at right angles, four petals arranged crosswise and two sets

of stamens, an outer longer set with two members and an inner set with four. In this country woad is not much visited by insects and as a rule is self-pollinated. Hegi, on the other hand, states that the flowers are commonly visited by bees and that cross-fertilization is frequent.[1]

The fruiting raceme is very short; the pedicels are

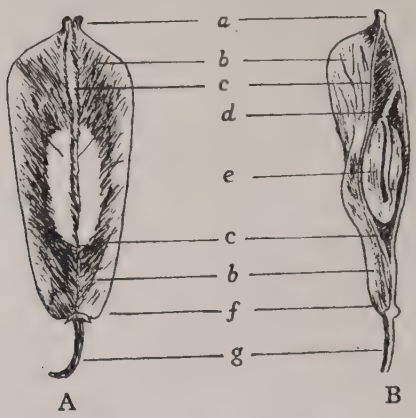


FIG. 1. WOAD POD

A = External aspect. *B* = Longitudinal section. *a* = apex. *b b* = wing-like expansion. *c c* = carpellary ridges. *d* = funicle. *e* = ovary with radicle and cotyledons. *f* = base. *g* = pedicel (cf. Fig. 2).

slender, deflexed, $\frac{1}{4}$–$\frac{1}{2}$ inch long. The pods (Fig. 1) are pendulous, *c.* $\frac{1}{2}$ inch long and one-sixth of an inch broad, glabrous, at first straw-coloured, but purplish-brown when ripe. The fruit is a laterally compressed silicule, oblong-cuneate, broadest at the apex, winged at the base and apex, woody on each side of the seed-cavity, usually one-seeded, indehiscent. In rare instances the fruit, which in that case ripens late, opens by a vertical cleft separating the two carpels (Figs. 2, 3). When there are two seeds, these may be one above

[1] G. Hegi, *Flora von Mittel-Europa*, 1906–12 iv (i), p. 198.

the other, or side by side. There are air cavities above and below the ovum.

The dispersal of the fruit is mainly effected by its own

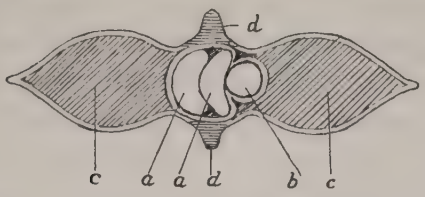


FIG. 2. WOAD POD (Transverse section)

a a = cotyledons. *b* = radicle. *c c* = woody portions of the silicule. *d d* = ridges derived from the fused carpellary leaves.

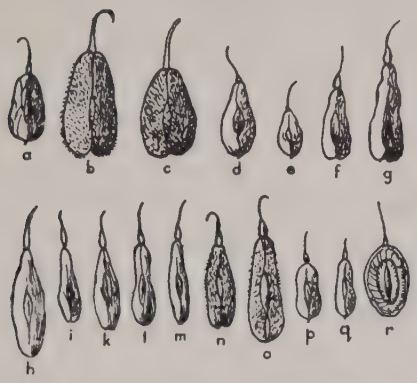


FIG. 3. VARIATIONS IN WOAD PODS

a = *Isatis tinctoria* var. *praecox*. *b c* = var. *hebecarpa*. *d e* = var. *alpina*. *f g* = var. *vulgaris*. *h* = sub var. *subelliptica*. *i k* = *maeotica*. *l m* = sub var. *taurica*. *n* = sub var. *villosa*. *o* = var. *canescens*. *p q* = var. *campestris*. *r* = *Isatis alpina* (after Reichenbach), *h* (after Hegi), others after Trautvetter—all reduced.

mechanism, being materially aided by the wings. The pods are pendulous when ripe and fall at some distance from the parent plant, especially on windy days.

The seeds are light brown, cylindrical or oblong, tipped with the short funicle by which they are suspended from the apex of the cell; the hilum and micro-

pyle are contiguous at the upper end of the seed and nearest the base of the style. The endosperm is either absent or merely forms a thin film on the inner face of the testa.

The embryo is large, filling and conforming to the seed, curved or bent upon itself, yellowish. The cotyle-

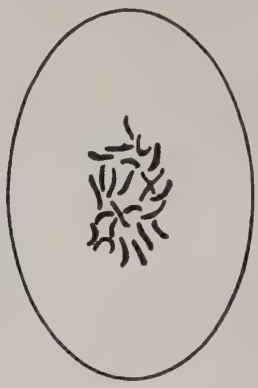


FIG. 4. CHROMOSOMES OF WOAD
from root-tip (polar view) × 2400

dons are oblong, obtuse, entire. The radicle is spindle-shaped, narrowed to an obtuse point, lying along the back of the incumbent cotyledons and slightly longer through forming the curve at the apex of the seed, while the cotyledons are straight.

The accompanying illustration of the metaphase nuclear plate of a somatic cell of woad shows the diploid number of chromosomes (Fig. 4).

B. ECOLOGY

Every plant must be adapted both in its external and internal structure to the conditions under which it lives. In what way does woad conform to this law? The full reply would involve an inquiry into the form, anatomy,

physiology, and life-history of the plant, as well as into its environment; no such elaborate inquiry has yet been attempted. A few observations may, however, not be out of place, leaving a more detailed analysis to future research.

Woad presents the characteristics of a plant belonging to the temperate zone, its life being adapted to moderate temperatures; in other words it forms part of the mesothermic flora.[1] The periodicity of the seasons influences the processes of germination, root-development, flowering, pollination, and fertilization. The active period extends from about February to November, the resting period from December to January. Germination, root-development, and rosette formation take place during the first season, while the production of flowers and fruit occupy the second season, during which a flowering shoot is sent up at the expense of the nourishment stored up in the tap-root and root-stock during the previous season. The plant exposes its leaf-surfaces at right angles to the direction of the brightest light, heedless of direct insolation. Moderate degrees of altitude, humidity, and wind appear to suit its growth. The foliage leaves live through the winter.

Woad is therefore a dicyclic plant, the first period resulting in a rosette of leaves, while the second ends in flowering and fruiting. The time of flowering is closely associated with the alternation of hot and cold seasons. Doubtless this corresponds with a continual stream of assimilated matter from the root into the stem and leaves, flowers and seeds (starch-glucose). After the maturation of the seed, there is a return flow of assimi-

[1] No trace of woad has been found in Neolithic or Roman times. (C. Reid, *The Origin of the British Flora*, 1899, p. 171.)

lated matter towards the leaves and root. In this series of phenomena both temperature and heredity co-operate.

Further, woad presents all the adaptations of a land plant. Transpiration probably takes place both through the cuticle and stomata, whilst the possession of a strong tap-root facilitates the free absorption of water. The succulent leaves allow a considerable storage of water.

In this country woad grows apparently wild in old stone pits and chalk quarries, having a preference for soil containing lime. Where the plant appears to be growing wild in Western Europe, however, it is probably only an escape from earlier cultivation, and should be looked upon as a long-established alien. Various edaphic factors, i.e. the character of the soil as regards the presence of humus, air, water, acid, &c., do not materially affect the development of the plant, although the largest production of succulent root leaves is obtained where the soil is rich. Moreover, woad rapidly exhausts the soil in which it is cultivated, so much so that the ancient woadmen never remained long in one spot.

The crown of foliage and the development of the root-system are, of course, closely related to each other. The greater the supply of organic food manufactured in the leaves or salts supplied by the root the more extensive the surface and the branching of the root-system. This development of the root-system in its turn determines the strength of the foliage and fruit. The size of the tap-root and the succulence of the leaves may indicate that the plant in early times had a dry *habitat*.

C. EVOLUTION

The story of the evolution of woad is that of the *Cruciferae*, which generally possess a bi-carpellary cap-

sule containing a number of seeds which are released by dehiscence and scattered by rain wash and by the wind. *Camelina* has a globose capsule; this is flattened in *Capsella*, which has twenty-four seeds. *Teesdalia* has the capsule more winged and the seeds reduced in number to two in each cell. *Iberis* is more winged and has one in each cell. The flattening of the capsule allows the replum, when the capsule dehisces, to act as a tennis racket and throw the seed some distance from the plant, the distance being increased by the action of the wind. In the next evolutionary stage *Thlaspi arvense* has a wider, flatter, and indehiscent capsule, which contains two to four seeds in the cell; the whole capsule is blown off the plant. Woad has a peculiar oblong oblanceolate fruit which does not dehisce. It is one of the best adapted of all the *Cruciferae* for wind dispersal over open plains, since each pod is practically separately winged. As with other wind-dispersed plants the pedicels of the flower are elongated during the ripening of the fruit so as to expose them fully to the wind. Another peculiarity in most plants of this class is the fact that the basal foliage partially disappears before fruit is ripe; by this means its lodgement in the decaying leaves is prevented, especially when the leaves are large and abundant.

The scattering by the wind of winged pods promotes the growth of sturdy plants. Were the pods merely dropped beneath the parent there would be overcrowding and the new plants would be sickly growths.

D. ORIGIN AND DISTRIBUTION

According to Dunn, *Isatis tinctoria* is 'apparently native in south-east Russia, where Korshinsky recorded

it growing as a native, on exposed hillsides and in breezy places. Its cultivation from the earliest times has led to its occasional appearance in an apparently spontaneous state in other parts of Europe, including England. It is one of those species which occasionally appear in plenty when ground is newly turned, doubtless on the site of former woad-crops, in which stragglers have persisted and seeded from time to time, until some disturbance of the ground has given the seeds a chance of germinating.' [1]

The genus *Isatis* L. belongs to the family *Cruciferae*, and is placed by Bentham and Hooker in the *Genera Plantarum*, in the tribe *Isatideae*. Prantl, in the *Pflanzenfamilien*, places it in the subtribe *Sisymbriinae* of the tribe *Sinapeae*. There are approximately fifty species which are distributed throughout Europe, North Africa, Asia Minor, Northern and Central Asia, Japan and China, the greatest number of them being found in the Eastern Mediterranean Region, which seems to be the source of origin from which members of the genus became dispersed.

Besides *Isatis tinctoria* L., originally cultivated for the sake of its dye and now occasionally grown in gardens for its historical interest, or in herbaceous borders or herb-gardens for its stately appearance and showy inflorescence, only one other species of the genus, *Isatis glauca* Auch., appears to be found in cultivation. This species, a strong glaucous perennial two to four feet in height, can be distinguished from *I. tinctoria* by the stem leaves, which are subpetiolate and have no auricles, while those of the latter species are sessile with narrow auricles at the base.

[1] S. T. Dunn, *Alien Flora of Britain*, 1905, p. 22.

Considerable confusion exists in the nomenclature of the species of *Isatis*, and it is impossible to determine, in our present state of knowledge, which of the described species are really distinct and which should rank as varieties or forms of *I. tinctoria*—undoubtedly a very variable species. Two varieties seem sufficiently distinct:

(*a*) Var. *canescens* (DC.) Boissier in *Flora Orientalis* (1867), i, p. 381. This can be distinguished from typical *I. tinctoria* by its hairy fruits, which are otherwise similar in size and shape. The basal leaves are usually hairy.

(*b*) Var. *stenocarpa* Boissier, i, p. 381. The fruits are narrower than in typical *I. tinctoria* and are thickly covered with fine hairs, the basal leaves being also densely hairy. This variety was originally described by Boissier as a distinct species under the name *Isatis tomentella*.

Isatis tinctoria L. is one of the most widely distributed species of the genus, and occurs throughout Europe, North Africa, and Asia as far as China and Japan.[1] There are specimens in the Herbarium of the British Museum[2] from Great Britain, France, Germany, Holland, Sweden, Switzerland, Austria, Spain, Italy, Corsica, Macedonia, Morocco, Madeira, Canary Islands, Asia Minor, Afghanistan, and Cashmir.[3]

[1] G. Watt, *Dictionary of the Economic Products of India*, 1890, iv, p. 524, states that woad or 'Devil's weed' is common in Western Tibet, Afghanistan, &c., occurring both wild and cultivated. It is also grown in certain regions of China and yields the indigo of that country.

[2] A list of specimens in the Herbarium at Kew will be found in Appendix II.

[3] Hakluyt makes several references to the cultivation of woad in foreign countries. Thus in the Azores woad was grown in the Islands of Fayal, St. Michael's, and Terceira, while in Madeira the Portuguese

Woad was evidently cultivated in Egypt early in the Christian era, no less than eight references to the plant occurring in the *Oxyrhynchus Papyri*.[1] Four of these entries occur in leases of farms with prohibitory clauses. The fifth is a revenue account relating to various villages in the Oxyrhynchus nome. Wool and woad are here associated, one of the villages being called Baph(e)on or 'Dyer's house'.

sowed great quantities of woad. In New Spain also woad was grown. Cf. *Navigations and Voyages of the English Nation* (Everyman ed.), i, p. 183; iii, p. 94; iv, pp. 152, 359; v, pp. 27, 235; vi, pp. 172, 229, 289.

W. Cholmley speaks of the Spaniards and Portuguese trading to Calicut, Barbary, Nova Hispania, the Canaries, Peru, Brazil, and many other countries to fetch sugar, spices, woad, brazil-wood, gold, and other commodities, in exchange for English cloth. Cf. *The Request and Suite of a True-hearted Englisheman*, by W. Cholmley, 1553. (*The Camden Miscellany*, 1853, ii, reprinted by W. J. Thoms.)

Dr. G. E. Post (*Flora of Syria, Palestine, and Sinai*) states that *Isatis tinctoria* grows in the Plain of Gennesaret. Not far from the latter was Magdala, where were situated a dyer's tower and eighty workshops of weavers of fine wool. Cf. A. Neubauer, *La Géographie du Talmud*, 1868, pp. 217–18.

[1] Vol. i, Pap. 101, A.D. 142; ii, Pap. 280, A.D. 88–9; iii, Fragment 593, A.D. 172–3; iv, Pap. 729, A.D. 137; vii, Pap. 1052, 4th century; x, Pap. 1279; xiv, Pap. 1685 and 1689.

CHAPTER II

THE CULTIVATION OF WOAD

ALTHOUGH woad can be grown in almost any soil, its successful cultivation from an economic point of view depends greatly on the knowledge and skill of the woad-grower. These factors determine the productivity of the plant.

The subject may be classified as follows:

A. SOWING.
B. AFTER-CULTURE.
C. CROPPING.
D. PRODUCTIVITY.
E. DISEASES.
F. EXPENSES AND RECEIPTS.

A. SOWING

The best soil is a deep rich well-drained loam, such as a recently broken-up grassland or an alluvial tract bordering a river. Even where the soil is suitable careful preparation by repeated ploughings to a depth of about 5 inches, followed by harrowings, is desirable in order that a good mould may be provided.[1]

The plant has a tap-root which penetrates deeply into the ground and therefore requires a considerable depth of earth. The stronger the root the heavier the crop of leaves. A stiff clay is unsuitable.

The *seed* may be broadcasted at the rate of two or three bushels of pods per acre, or may be sown in drills

[1] Fuller details of the cultivation of woad in England are given in Rees's *Cyclopaedia*, 1819, vol. xxxviii, *s.* Woad; J. C. Morton, *Cyclopaedia of Agriculture*, 1855, ii, pp. 1159 f.

from eight to twelve inches apart; in this case a bushel per acre is sufficient. The seed is sown in the husk and should be deposited about two inches below the surface, fresh seed being more productive than that a year or more old.

Some farmers arrange the drills as much as two feet apart, as this plan facilitates hoeing between the rows and gives plenty of room for the plants, which then produce more succulent leaves and a better quality of dye. Some artificial manure may be drilled in with the seed.

The time of sowing extends from February to July. Early sowing is the best, since it gives the plants more time for full development.

With the drill method, the seed is usually sown by a drilling machine similar to that used for turnips, and is afterwards covered by means of a harrow, any remaining clods being raked off.

In favourable seasons the seedlings appear in about a fortnight. At first they are tender and bruise easily; but they soon grow hardy and can then be pricked out into even rows, with intervals of nine to ten inches between the plants. Sometimes they are damaged by early frosts, in which case the field may have to be resown.

B. AFTER-CULTURE

The *after-culture* consists in hoeing, thinning, soil-stirring, and weeding, these operations being performed either by hand or by horse tools.[1] Weeding is best done

[1] Morton in his *Calendar of Farm Operations* gives details relating to the cultivation and manufacture of woad for every month of the year excluding May and July. Cf. J. C. Morton, *Cyclopaedia of Agriculture*, 1851, i, pp. 1 f.

WEEDING A WOAD FIELD

Woad, if it was to reach a high level of productivity, was carefully freed from weeds three or four times during the season, a tool known as a woad spud being used for loosening the weeds. The weeding was done in the kneeling posture. The labourer on the right is grasping a spud. The Parson Drove woad mill is seen in the background

WOAD SPUDS

Two English woad spuds used in weeding woad fields

by labourers kneeling between the rows of plants as soon as these are two or three inches high (Pl. II). Every plant should be dealt with in turn, singled, and cleared of weeds, chick-weed being usually the most troublesome. There is no greater impediment to healthy development than to allow the young plants to be jostled by their neighbours and thus to become spindly.

The weeders use for the purpose a short home-made hand-spade or spud [1] (Pl. III), which is grasped in one hand, while the other gathers the weeds and deposits them in the adjacent furrows. Women weeders wear a rough skirt, while male weeders wear leather knee-caps.[2]

In addition to being weeded, the plants should, where necessary, be thinned, so as to be eight to ten inches apart. In fact each plant should be freed from competition with its neighbours if the highest productivity is to be attained. Careful and individual hoeing is also of great value.

C. CROPPING

When the plants have been weeded twice their leaves are generally ready to be gathered. The date is usually the end of June or the beginning of July, but depends on the nature of the soil, on the season, and on the climate. The plants will probably be six or seven inches high, but they have been cropped at the height of as much as eighteen inches. The picking, which is also done in the crawling position, should begin as soon as

[1] Specimens of the woad spud used for weeding woad may be seen at the Museum at Kew and at the Museum at Wisbech. Cf. also *J. British Archaeological Assoc.* ix, 1903, p. 96.

[2] These details of culture were those recently practised by the woad growers in the Parson Drove village near Wisbech. They varied considerably on different woad farms.

the leaves are fully grown, while they still retain their rich green colour and full succulence. When they begin to turn pale the value of the leaves diminishes.

The pickers detach the leaves from the stem by grasping them firmly with the hand and suddenly twisting them off, the stem being left undisturbed so as to allow the growth of later crops. Meanwhile the detached leaves are thrown into large baskets or skeps, and conveyed by cart to the woad mill.[1]

An improved method consists in the use of light one-horse carts, whose bodies on arrival at the mill are hoisted by tackle to the first floor, from which the contents can be discharged directly beneath the rollers. Care must be taken not to include any weeds with the woad leaves; nor should the leaves be gathered when wet, for fear of causing premature fermentation. The pickers usually spend the morning in plucking the leaves and the afternoon in 'balling' the pulp, as will be described in Ch. iii.

Where the soil is rich, the leaves may reach a length of about a foot and a breadth of about six inches. The number of croppings varies with the vigour of the plants, two or three gatherings during the season often being possible. The first crop (virgin woad) is esteemed

[1] In the case of extensive fields of woad a large number of skeps, sometimes as many as 700–800, are scattered about the field to hold the picked leaves, in order to save the time of the workers.

In Germany the leaves, before going to the mill, were thoroughly washed in a stream or a clear pond, and were then dried by being spread out on some grass and turned over several times. At Erfurt the open space called the Anger, formerly the 'Waidanger', was probably used for this purpose. The proximity of water to the woad fields as well as to the mill was a distinct advantage. An old German proverb (A.D. 1550) says:

> The first who goes his woad to swill
> Will be the first to quit the mill.

the best, and the after-croppings should be kept distinct from the first, as the dye derived from them is of inferior quality.[1] At the end of the season what remains is readily devoured by sheep,[2] especially after one or two frosts have given the leaves a sweetish taste.[3]

In order to provide seed for future cultivation, some of the strongest plants are allowed to retain their leaves through the winter; by the following July or August the plants will flower and fruit. A field of woad in bloom closely resembles one of mustard, both in the colour of the flowers and the height of the plants. The fruiting stems should be allowed to retain their pods till these have assumed a blackish appearance, by which time the seeds will be of a light-brown colour. The plants are then reaped in the same manner as corn and spread out on the ground, provided the weather is fine.

[1] In France and Italy there may be nine or even ten pickings, whereas in England and Germany the number rarely exceeds three.

[2] During the reign of the usurper Mac Con in Ireland a celebrated Irish lawsuit was associated with the eating of a crop of woad or *glaisín* by sheep. Cormac Mac Art, the rightful heir to the throne of Ireland, was then but a boy, and lived at Tara in disguise, since he dared not reveal his identity as the throne was held by the usurper Mac Con. At that time there was living near Tara a female *brewy*, named Bennair, whose sheep trespassed on the royal domain, and ate up the queen's crop of *glaisín* which was intended for dyeing. The queen instituted proceedings for damages; and the question came up for decision before the king, who, after hearing the evidence, decided that the sheep should be forfeit in payment for the *glaisín*. 'Not so,' exclaimed the boy Cormac, who happened to be present and could not restrain his judicial instincts: 'the cropping of the sheep should be sufficient for the cropping of *glaisín*—the wool for the woad—for both will grow again.' 'That is a true judgement,' exclaimed all, 'and he who has pronounced it is surely the son of a king'—for kings were supposed to possess a kind of inspiration when giving their judgements. The people discovered the identity of Cormac and in a short time placed him on the throne, after deposing the usurper. (Silva Gad., 288, 357.) Cf. also P. W. Joyce, *Social History of Ancient Ireland*, 1903, i, p. 216.

[3] J. C. Morton, *Cyclopaedia of Agriculture*, 1855, ii, p. 1160.

In the course of a few days the husks or pods can then be threshed from the stems. As the pods are indehiscent and do not shed their seed as do most plants, the whole pod with the seed inside is sown. It is a good plan to steep the pods in water for some days before they are sown. Pods from an acre of woad plants will suffice to sow forty to fifty acres.

D. PRODUCTIVITY

An acre of woad plants should yield one and a half to two tons of manufactured woad; three tons per acre may be obtained on the best land. The leaves of an average crop fill five large cart-loads.

The rapid exhaustion of the soil by woad was well recognized in the Middle Ages, and sometimes induced the inhabitants of a district to protest against the advent of woad farmers.

Thus we read of the following proclamation in 1585 directed against the sowing of woad: 'That no maner of person or persons . . . shal . . . breake up . . . any manner of grounde . . . for the purpose to sowe or plant woade in.' Again the archives of the corporation of Southampton for 1597 record that a remonstrance was entered against the sowing of woad in Hogland 'because the common sort of people find themselves greatly grieved withal, for that, after woad sowing, there will grow no grass, nor anything else for the cattle to feed upon'.[1] Babington also states that at Ely, where woad had only been grown for one year, the parish requested that its cultivation be discontinued for fear of increasing the number of paupers. The villagers doubtless feared that

[1] A. Pratt, *The Flowering Plants of Great Britain*, 1899, i, p. 55. Cf. also T. Fuller, *The Worthies of England*, 1840, iii, p. 87.

the exhaustion of the soil would diminish the demand for labour.[1]

Some old leases are still extant which contain clauses forbidding the cultivation of woad, owing to its exhausting effect on the soil. For instance, a lease of 1856 contains 'a long and explicit covenant against growing pernicious weeds, such as flax, hemp, woad'.[2]

E. DISEASES

Loudon [3] states that the only diseases to which woad is subject are mildew and rust, while *Aphis brassicae* is the one insect that lives on it.[4] A commoner enemy is the turnip fly (*Phyllotreta nemorum*), which devours the young plants before they are strong enough to be thinned. Its ravages may be so extensive that the whole crop needs to be resown. Giobert states that on the Continent snails and the cabbage caterpillar (*Pieris brassicae*) may do much damage.[5]

Of recent years much study has been devoted to fungi, and Saccardo mentions the following as occurring on *Isatis tinctoria*:

Aecidium Isatidis Re. (UREDINACEAE).[6]
Ophiobolus herbarum (Otth.) Sacc. (SPHAERIACEAE).[7]
Cicinnobolus Cesatii De Bary (SPHAEROIDACEAE).[8]
Monilia Glasti Plowr. (MUCEDINACEAE).[9]
Oidium erysiphoides Fr. (MUCEDINACEAE).[10]

[1] *Gardeners' Chronicle*, 1881, i, p. 788.
[2] *Farmers' Magazine*, Jan. 18th, 1877.
[3] J. C. Loudon, *Encyclopaedia of Agriculture*, 1871, p. 921.
[4] A. R. Horwood, *British Wild Flowers*, ii, p. 172.
[5] J. A. Giobert, *Traité sur le Pastel*, 1813, p. 34.
[6] P. A. Saccardo, *Sylloge Fungorum* (1882 onward), xiv, p. 370 (1899).
[7] l.c., xiv, p. 615 (1899).
[8] l.c., iii, p. 216 (1884).
[9] l.c., xviii, p. 501 (1906).
[10] l.c., iv, p. 41 (1886).

F. EXPENSES AND RECEIPTS

The expenses and receipts associated with the culture of woad varied greatly. The labour was partly done by the 'great', i.e. by a contract for the whole estate, and partly by the day.[1] The contract for the 'great' began in the middle of June, or whenever the weeding commenced, and lasted until Martinmas Day (Nov. 11th), or until the cropping was finished for the year. During this period of about five months the hands (men, women, and sometimes children) weeded the woad fields three times, viz. twice before the first cropping and once immediately afterwards. They also cropped the fields two or three times as might be required; in this case the payment was per acre. On the other hand, the men who conveyed the woad leaves from the field to the mill, as well as those who ground the leaves and made the 'balls', were paid according to the number of tons of manufactured woad that were eventually sent to the market. The payments varied with the special circumstances of every woad farm.

In the early 19th century, weeders and croppers earned about £3 3*s*. per acre, the seed having generally been sown broadcast; 5*s*. per ton was paid for carting, 7*s*. for grinding the leaves, and 12*s*. per ton for 'balling'.

Mr. G. L. Nussey has kindly supplied the following details of wages paid to the woadmen up till *c*. 1900.

The first operation in the cultivation of woad was the preparation of the ground; for this the labourers received about 24*s*. a week. When the preliminary ploughing and harrowing were over, wages were reduced to 15*s*. a week, and this rate lasted all through the

[1] J. C. Morton, *Cyclopaedia of Agriculture*, 1855, ii, p. 1162.

spring and summer, i. e. during the processes of sowing, weeding, picking, and grinding the leaves.

In other cases when the woad plants appeared above ground, the land was parcelled out into fields of seven or ten acres, when the weeding and cropping of woad was done by gangs of agricultural workers engaged by contract. When the ground was not parcelled out into separate plots, it was divided into smaller areas by shallow trenches; in this case every individual worker took charge of his own plot and balled his own share of leaves. These workers were paid £3 per acre for weeding and cropping, and received in addition a rood of potatoes. They were paid 12*s*. per ton for balling and for placing the balls on the ranges; and 25*s*. a day for conveying the balls from the ranges to the couching house, and for turning over the woad daily for seven weeks till the fermentation process was completed. They then weighed and casked the woad, which was at that time worth about £11 a ton on the market.[1]

Between 1917 and 1922 the price of woad varied from £17 10*s*. to £35 a ton; to-day it is worth from £40 to £45 a ton. The annual consumption has dwindled to 10 or 12 tons.

The following specimen balance-sheet shows approximately the expenses and receipts concerned in the cultivation of woad per acre. When woad farmers cultivated many acres the profits must have been considerable.

[1] Mr. G. L. Nussey of Witham Bank, Boston, and Mr. Thomas Booth of Skirbeck, Boston, are the two remaining woad growers in England. They cultivate woad on their farms and prepare the dye for the woad vat.

CHAPTER III

THE MANUFACTURE OF WOAD: THE WOAD MILL

WOAD is not only the popular name of the plant known to botanists as *Isatis tinctoria*; it is also the name given to the dye prepared from the leaves of that plant. In the previous chapter was described the transportation of the picked woad leaves to the woad mill. This chapter will deal with the various processes to which those leaves are subjected in that mill during their conversion into the commercial dye.

The woad mill, as it formerly existed in this country, consisted of the following departments:[1]

A. THE ROLLER HOUSE.
B. THE DRYING RANGES.
C. THE COUCHING HOUSE.

A. THE ROLLER HOUSE

The Roller House was a circular structure built of turf walls, which were about 3 feet wide at the base and grew narrower towards the top (Pls. IV, V). The turf blocks, a foot deep, were cut obliquely, and arranged in a herring-bone pattern. The walls, about 4 feet high, supported a high wide roof of timber and hurdles, thatched with reeds. The floor was circular, about 24 feet in diameter, and paved with blocks of stone.

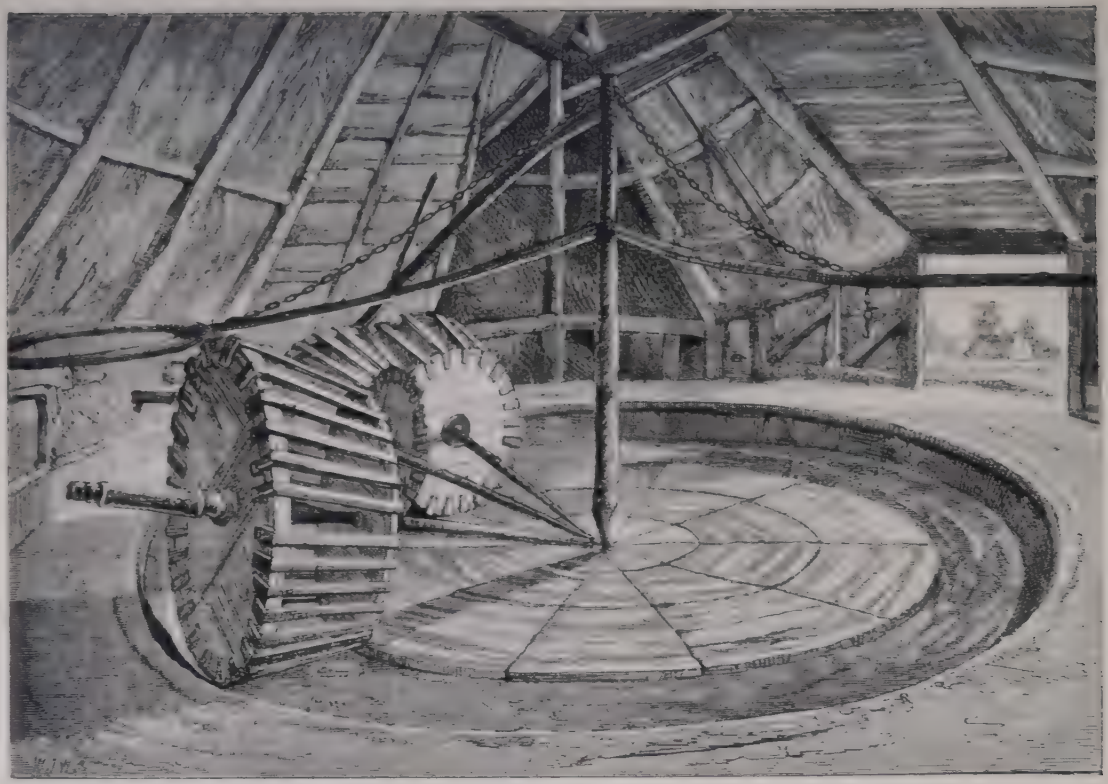
[1] This description of an English woad mill is largely based on an article by F. Darwin and R. Meldola describing the mill at Parson Drove, near Wisbech. Cf. 'An English Woad Mill', *Nature*, lv (1896–7), pp. 36 f. Cf. also *Aunt Judy's Annual*, 1883; *J. R. Horticultural Society*, xxvi (1901–2), p. 34.

WOAD MILL AT PARSON DROVE

General view of the woad mill at Parson Drove, near Wisbech. On the left is seen the roller house. The long central building is the couching house. On the right are seen the drying ranges

WOAD MILL AT PARSON DROVE

The walls were composed of turf blocks, arranged in a herring-bone pattern



WOAD ROLLERS FOR CRUSHING THE WOAD LEAVES

This view shows three woad rollers which were used for crushing the leaves into a pulp. Each roller was drawn by a horse and revolved in a pan filled with woad leaves

The vertical edge-runner rollers or crushing machines (Pl. VI), usually three in number, which occupied this circular compartment, were each worked by one horse,[1] the harness being attached by poles to a central wooden pillar.[2]

As the horses walked round the edge of the wide circular pan which received the woad leaves, they carried these triturating rollers round with them. Each roller or crushing wheel was a massive, obtusely conical structure weighing from 15 to 25 cwt. It was built of two strong wooden discs, joined together somewhat in the fashion of an overshot water wheel, with bands of iron two inches broad and half an inch or more in thickness. The bands were lapped over on to the timber bases, and bent at right angles so as to expose a series of some forty cutting edges. The outer face of the wheel was about $7\frac{1}{2}$ feet in diameter, the inner 6 feet. Running through each was an axle pivoted to a central pole, and prolonged externally for the attachment of horse gear. In order to obtain a direct pull on these axles the horse track was raised between two and three feet above the level of the floor, and kept in position by rough stakes and boards. Sometimes brooms were provided which kept the woad in the track of the wheels.[3]

[1] Each horse was led by a separate man who was liable to suffer from dizziness through constantly walking round. Crolach mentions the case of a man who became giddy, fell beneath the wheel, and was killed.

[2] In large woad mills such as the one at Brothertoft near Boston, there were 8 wheels for crushing the woad, requiring 8 horses at a time. The horses worked in two shifts, or in busy times in three shifts, so that 24 horses in all might be needed. Thus a woad mill at the time of leaf-picking would be a scene of great activity. The latest development has been the substitution of steam for horse power.

[3] In Thüringia the rollers were composed of sandstone, often brought

It was to this roller house that were brought the woad leaves as soon as they were stripped from the plants, the comminution into a pulp being the first stage in the manufacture of the dye.

As soon as the crushing was completed the pulp was thrown into small heaps and allowed to drain, until sufficiently dry to become coherent. It was next hand-kneaded by the workmen into balls two to six inches in diameter.[1]

The equipment for balling consisted of what was called the 'form' or 'balling horse', a round or square board, on which the workman placed a large double handful of the pulped leaves which he converted into a ball, partly by kneading and partly by rolling. This ball was then placed in a wicker-work tray or 'fleak' lying on the 'loading form' beside him, and this fleak, when full, was pushed along to the upper end of the 'form' and transferred to the padded head of another workman who conveyed it to the Drying Ranges (Pl. VII). In order to enable the workman to get into a convenient position, the upper end of the table was cut out into two prongs between which the workman could insert his neck.

A man could 'ball' (Pls. VIII (*a*), VIII (*b*)) about as much woad as a horse could crush; the operation stained the workmen's hands almost black, the dark colour persisting until the formation of fresh epidermis.

from the quarries at Seeberg near Erfurt, and measured about two meters in diameter, with a thickness of 30–50 cm.

In the Predigerkirche near the Erfurt Town Hall is a tombstone on which a woad roller forms part of armorial bearings. (E. Wagner, *Waidbau und Waidhandel*, 1925, p. 11.)

[1] J. Astruc, l.c., p. 325, states that in Languedoc the regulations insisted that each ball must weigh *c.* 1¼ lb. ('cinq quarterons poids de table').

WOADMAN CARRYING WOAD BALLS
TO THE DRYING RANGES

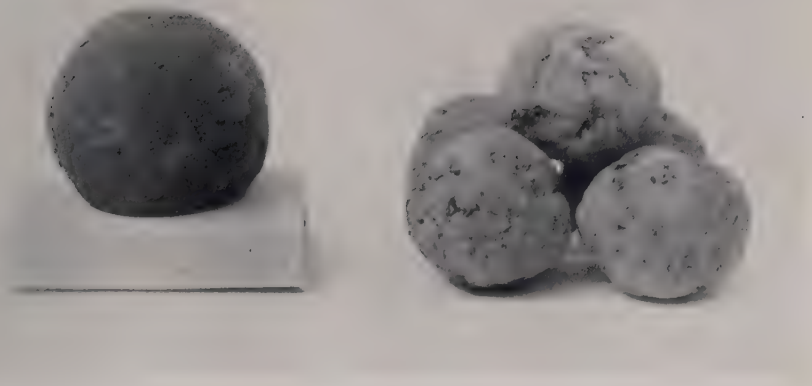
After being kneaded into balls these are placed on a tray lying at the end of the 'loading form' and carried on the head of a labourer to the drying ranges or racks. In the background are seen the ranges at Parson Drove woad mill, with some balls already in place

(*a*) BALLING HORSE, LOADING FORM, AND TRAY USED IN 'BALLING' THE WOAD LEAVES

The drying ranges are seen in the background

(*b*) WOADMEN 'BALLING' THE WOAD

Two labourers with lumps of crushed leaves out of which, with the help of 'balling horses', they manufacture the woad balls



WOAD BALLS

Woad balls that have been dried by exposure to the air for some weeks. The largest ball measures three inches in diameter

B. THE DRYING RANGES

The Drying Ranges were well-ventilated wooden erections supporting a series of gratings, technically called 'ranges', and arranged in tiers one above the other.

As the trays of balls were brought to the drying sheds, they were placed on grates which were so contrived as to slide along ledges and thus form shelves.

In these ranges the woad balls were thoroughly dried, a process which took from one to four weeks. When thoroughly dry the balls were taken to the store rooms, where they awaited the final preparation of the dye, which took place in the *couching house*. The first, second, and third pickings were kept separately in the store room.

C. THE COUCHING HOUSE

The *Couching House* at the Parson Drove Mill occupied the two thatched wings of the mill. It measured about fifty feet by twenty, and could hold many tons of woad; the floor was paved with stone. In order to render the balled woad fit for the dyer, it had to undergo a process of fermentation which was called *couching* and formed the most difficult stage in the manufacture.

The woad balls were in the first place conveyed from the store to the Roller House and there ground to powder by the same machinery that had pulped the green leaves. The pulverized mass was next conveyed to the *Couching House* and piled up into a layer two or three feet deep.[1]

[1] The following recipe for preparing woad is given by Hearne, in his Introduction to the *History of Adam de Domerham*, 1727, p. 87:

'In the mounthe of Marche take thy sede, and sowe hit in goude

The powdered mass was then sprinkled with water, and allowed to ferment for about nine weeks. Meanwhile the fermenting mass was turned over frequently by the woadmen and sprinkled with water until it was converted into a paste. At first the fermentation or *couching* process was very vigorous, the whole mass of woad becoming hot and steaming, and emitting disgusting odours.[1]

One of the difficulties in the process of *couching* was the exact regulation of the temperature, which should not exceed about 125° F., so as to ensure that the whole

londe wel y rakyd, and clene, and wan (when) hit ys groud viii ynchys longe, than rype hit, and grynd hit smal, and make balle hereof, as moche as a verthyng love, and lete ham dry a pon an hurdel in the sonne, and than grynd ham a zen smale in to poudyr, and than syfte hit thorwe a smale ryddyrue, and the grete there of grynde hit a zen, and syft hyt a zen as ze dyde a fore, and than ley al thy poudyr a pon a fayre pavyd flore a brode halfote thyke, and thare pon cast water, and turne and wende hitt with a shovyl, tyl hit be nothyr (neither) wete, nothyr dry, bote by twyxt to, and than ley hit up to an hype, as ye wold malt, tyl hit take hete, as hote as ye may suffyr youre hand thare in. And than ley hit a brode, and lete the heyre (air) passe away there of, and than ley hit to gedyr a gen to an hype, tyl hit be as hote as hit was, and than every day do in the same wyse, tyl hit wol take no more hete, and than hit most be led a brode a gen apon a fayre pavyd flore, and dry hit with turnyng with a shovyl every day, tylle hit be dry, and than hit ys ful made to go to the hodefade (woad vat?), and to dey goude Bluwe.'—J. Collinson, *History of Somerset*, 1791, ii, p. 400.

[1] The following incident probably applies to this stage in the manufacture of woad: 'In 1492, three persons were amerced for polluting the river between Dunster and Dunster Hanger with "le wodewater", when an order was made "That no dyer shall henceforth put or throw 'le wodewater' in the lord's stream before eight o'clock at night, under pain of 40*d*. every time".'—H. C. Maxwell-Lyte, *A History of Dunster*, 1909, i, p. 298. Cf. also *Victoria History of Hampshire*, v, p. 483.

Queen Elizabeth so disliked the ammoniacal odour evolved during the fermentation of woad that she issued a proclamation praying that during her progresses through the country she might not be driven out of the towns by the 'oade' infecting the air too near them. (R. H. Tawney and E. Power, *Tudor Economic Documents*, 1924, ii, p. 290.)

WOAD BARRELS

Barrels packed with woad that has been couched, and is ready to be dispatched to the dyer

mass of powdered woad should undergo fermentation to an equal degree. Experience was necessary for this, and every lump had to be well broken up so that no portion escaped fermentation. Otherwise the woad would not *beaver* well, the proof of efficient fermentation being that the woad would break up into fine filaments when rubbed between finger and thumb. Unless thoroughly fermented the woad would have a lower value when it reached the woad vat. If the temperature had risen too high, the woad became what was called *foxy*, while on the contrary too low a temperature left it *heavy*.

By the time the fermentation process was complete, the woad had become converted into a dark clay-like substance. It was then thoroughly dried, sifted, and packed tightly into wooden barrels, holding from twenty to thirty cwt. each (Pl. x). The barrels were then marked with the quantity of woad contained in each and the year of production, and were dispatched to the dyer.[1] Woad was said to improve greatly if it was kept for a while, owing to the action of a ferment, its efficiency in the woad vat being doubled in four years. Nine parts by weight of woad leaves were estimated to yield one part of woad dye as finally prepared for market.[2]

[1] While barrels were generally used for woad manufacture in England, the foreign article was imported in frails, a wicker basket which was evidently of large dimensions from the heavy duty levied on it (7*s*. per frail). (*Liber Albus*, ed. by H. T. Riley, 1862, pp. 63, 319.)

[2] In some cases the process of fermentation was carried out by the dyers themselves, who could then at once use the dye in the woad vat. In other cases dyers were merely called in to supervise this delicate operation on behalf of private persons who had dye vats in their own homes. The Woad Ordinances of Bristol (Appendix IV) contain numerous references to the two operations of breaking up and turning over the woad, which were carried out by licensed porters at a specified rate.

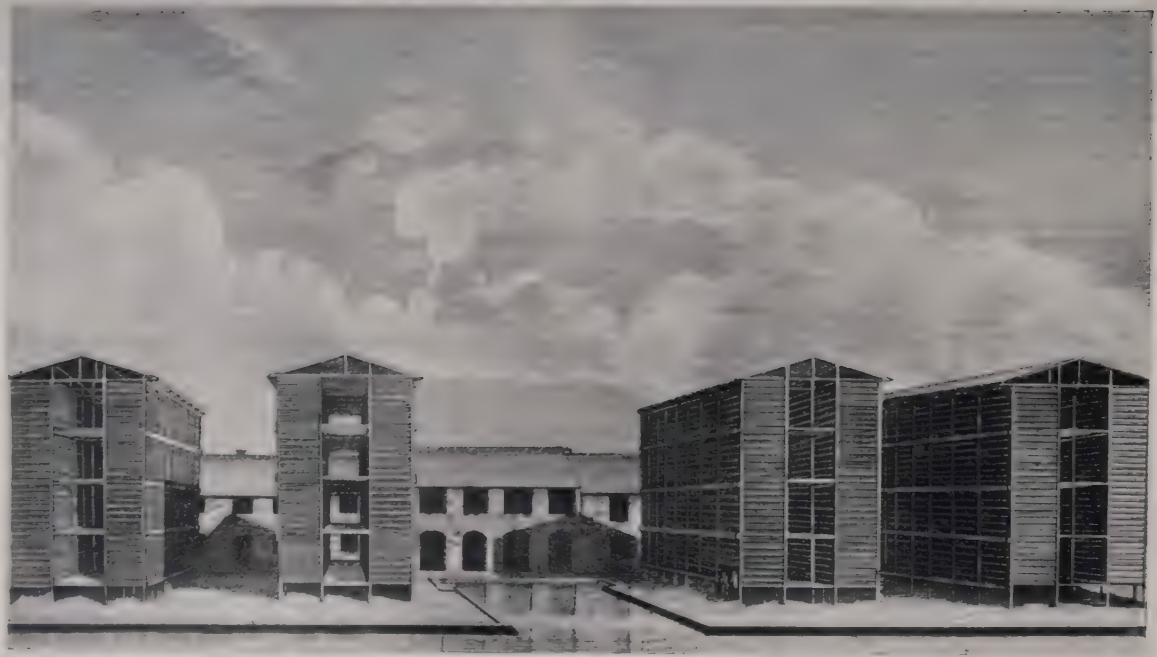
The ancient woadmen, after exhausting the portion of land on which they had erected their temporary mill, would usually migrate, carrying away with them the rollers and the paving stones belonging to the mill. As soon as a fresh site had been discovered a fresh mill would be constructed of sods, timber, and similar materials as had been used before. In due course the old rollers and paving stones would be fixed in place in readiness for a new round of operations.

After this somewhat full description of a primitive English mill, such as migratory woadmen erected as they moved about the country, ever seeking pastures new, we may briefly describe a modern mill, owned by a capitalist woad-grower, who aimed at high efficiency.

Pls. XI and XII represent the woad mill at Brothertoft farm,[1] near Boston, which was probably one of the most up-to-date mills in this country. Pl. XI gives a front view of the establishment, showing the roller house in the centre background, while the four sets of imposing drying sheds occupy the foreground. Each of these sheds is traversed by an open corridor running antero-posteriorly. The couching house occupied the two wings of the roller house, which can be seen behind the drying sheds.

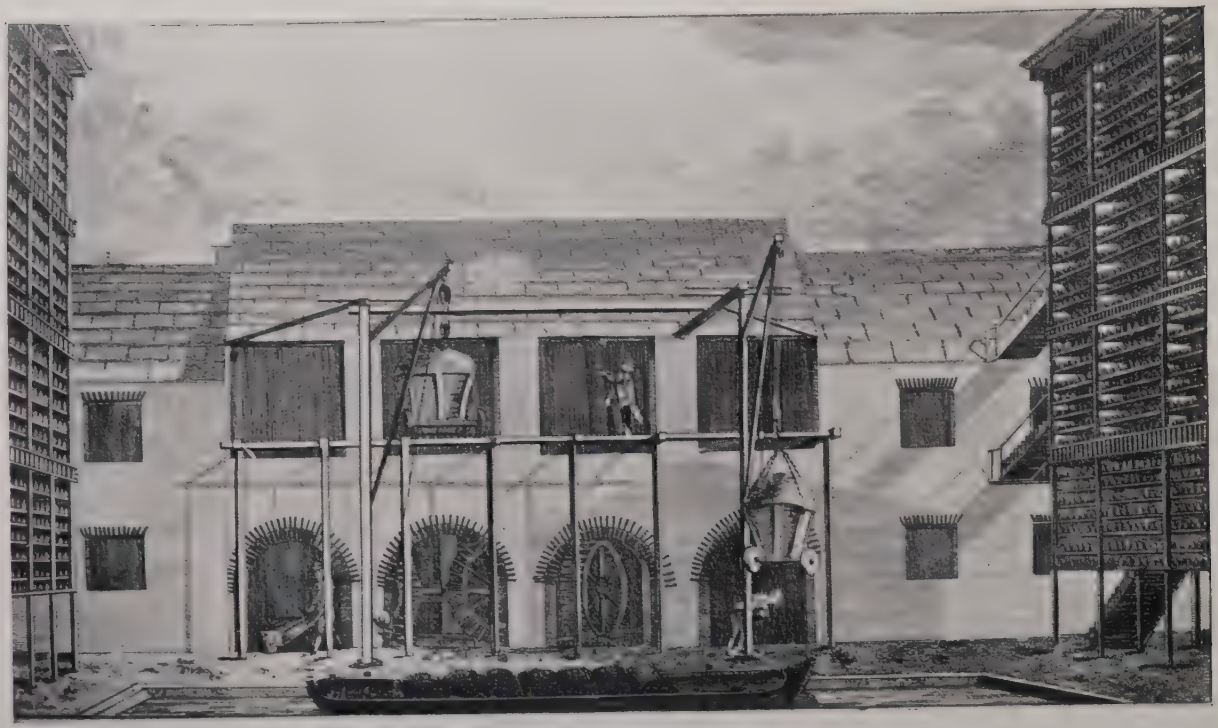
In Pl. XII the roller house is seen in greater detail, while partial views are obtained of the two couching houses (on either side of the roller mill) and of the drying ranges to the right and left of the picture. Through two openings can be discerned three of the eight rollers as well as the trough in which they revolve as they crush the woad leaves into pulp.

[1] A. Young, *General View of the Agriculture of the County of Lincoln*, 1799, p. 151.



WOAD MILL AT BROTHERTOFT

General view of the mill at Brothertoft, showing the roller house in the background and four series of drying ranges in the foreground



WOAD MILL AT BROTHERTOFT

Woad rollers and drying ranges at the Brothertoft woad mill. Two carts filled with leaves are being hoisted up to the first floor by pulleys. The drying ranges occupy the right and left sides of the picture

(*a*) FRENCH WOAD MILL

A woad roller drawn by a horse is seen in the foreground, together with the circular pan in which the woad leaves were crushed to pulp. In the background a workman can be dimly seen 'balling' the pulped leaves, while another workman conveys some balls to the drying ranges in the adjacent building

(*b*) GERMAN WOAD MILL

This view of a Thüringian woad farm and mill shows the growing woad, the weeding of the plants with the woad spud, the crushing of the leaves, and the placing of the woad on the drying ranges

The bodies of two small carts, whose bottoms are made so as to open and close at will, can be seen in process of being hoisted by pulleys to the first floor. The object of this arrangement is that the bottoms when opened shall shoot the woad leaves just in front of the rollers, thus economizing labour.

In the foreground of the picture is seen a barge with seven empty baskets whose complement of leaves has doubtless just been conveyed into the mill.

As soon as the crushing process was complete the pulp was shovelled into the rooms on either side of the roller house, where it remained for a few days to drain and until coherent enough for the 'balling' process.

The drying ranges consisted of 8 ranges divided into four groups each of which contained 96 grates, making 384 grates in all. Every two ranges were separated from the adjacent ones by a gallery, 6 feet wide, for the convenience of loading and unloading. The space beneath the ranges was used for the storage of barrels, some of them containing woad, and others waiting for their complement.

It is interesting to compare French and German woad mills with the English ones that have just been described. This can be done by means of the three following illustrations.

Pl. XIII (*a*) represents a French mill in which the woad leaves are being crushed into pulp by a heavy wheel which is drawn by a single horse. In the dark background may be seen a workman kneading the crushed leaves into balls, some of which another workman is carrying to the drying ranges in the adjacent building.

Pl. XIII (*b*) represents a Thüringian mill of the 18th century. In the background are seen three figures

gathering the woad leaves, while in the centre is a large and heavy wheel or roller with its axle fixed to an upright post. This wheel is turned by a pair of horses, and, as it revolves, crushes the leaves which the woadmen rake under the wheel. Behind the roller may be seen four slanting racks or 'ranges', each holding about four hundred 'balls', which have been kneaded out of the pulped leaves and are set out to dry. Behind these ranges may be seen several heaps of woad leaves waiting to be crushed. In the foreground of the picture will be noticed on the right a spud for weeding woad plants, similar in shape to that formerly used in England, while on the left are some crushed woad leaves and balls.

The next illustration (Pl. XIV (*a*)) represents a second German woad mill which existed at Pferdingsleben near Gotha until recent times, but which has now been destroyed. Alas! no single European country has shown enough interest in the monuments of mediaeval industry to preserve a woad mill for the benefit of future generations. There are, however, in various German villages some extant woad rollers by which in former years woad leaves were crushed. Some of these (Pl. XV (*a*)) have been incorporated in memorials of the great war, while others (Pl. XV (*b*)) merely serve to remind the younger generation of an important industry which is wellnigh extinct.

Pl. XIV (*b*) represents a woad hall at Gotha, in which woad was couched and thus prepared for the dyer's vat.

In Germany the couching or fermentation process was not usually carried out in the woad mill (Ch. viii). When the balls had been dried in the drying sheds, they were conveyed by the woad farmers to the nearest town, and sold under the name of 'green woad' to the woad

(*a*) GERMAN WOAD MILL

This mill at Pferdingsleben near Gotha, the last German woad mill, was pulled down a few years ago. In the foreground is seen the stone roller revolving in the circular pan. In the background are three sets of drying ranges

(*b*) GERMAN WOAD HALL

This German woad hall, in which woad was couched and thus prepared for the dyer, was situated in Gotha. As considerable heat was generated woad halls were substantially built and provided with iron shutters

(*a*) WOAD ROLLER PRESERVED AS A MEMORIAL

This roller of a disused woad mill is preserved as a memorial of the ancient woad industry

(*b*) MEDIAEVAL DYE VAT

This dye vat (15th century) shows the dyers in the act of stirring the vat in order to secure uniformity of colour

refiners who carried out the final fermentation. The woad was then sold to the dyers or woad merchants.[1]

A large part of the woad imported into England had only been balled and dried, the final fermentation being carried out in this country.

[1] H. Jecht, 'Der Ostdeutsche Waidhandel', 1923, p. 8 (*Neues Lausitzsches Magazin*, Vol. 99). For details of couching in Germany and France cf. Ure, *Dictionary of Arts*, &c., 1863, iii, pp. 1040–2.

CHAPTER IV

THE WOAD VAT

THERE is a fundamental difference between the mediaeval woad vat and the woad vat as used today, a difference of such importance that we must deal with the two forms of vats in some detail.

In connexion with the former a curious legend associated with the life of St. Ciarán has survived which deserves a heading to itself.

We shall describe in turn:

A. THE MEDIAEVAL WOAD VAT.
B. THE MODERN WOAD VAT.
C. THE LEGEND OF ST. CIARÁN.

A. THE MEDIAEVAL WOAD VAT

In the Middle Ages the woad vat was in universal use for directly dyeing textile fibres and fabrics with the highly fashionable dark blue woad colour (Pl. xv (*b*)). In fact, before the introduction of exotic indigo, woad supplied the only indigo-bearing dye-stuff, used either in this country or on the Continent.

In order to prepare the vat an aqueous solution of woad with the addition of a mordant, usually alum or potash,[1] was heated, and maintained at a high temperature for about three hours. In many cases some madder

[1] The chief mordants used in the Middle Ages were alum, potash, tartar, and sulphate of iron. Potash, obtained from wood ashes, was often called woad ashes, as it was mainly required for the woad vat. In early days it was prepared by leaching wood ashes left on the common hearth. Afterwards entire trees were often burnt for the purpose. Alum was imported largely from Italy. Tartar was obtained from the salt deposited by fermenting wine.

and bran were added to the mixture, as they accelerated the fermentation processes. After a certain interval, which depended on the quality of the woad, on the weather, and on other circumstances, the material to be dyed was immersed in the solution for a period which varied with the depth of colour desired. By this means various shades of blue were obtained. A very dark blue would result from a repeated immersion in a newly charged woad vat, while a light blue would result from the use of a less-concentrated vat liquor, from an exhausted vat, or from one that had been allowed to cool down and had thus lost much of its dyeing efficiency. The lightest blue would result from a brief immersion.[1]

A uniform distribution of the colour was secured by continuously moving the material to and fro in the dyeing solution, or else the latter was circulated through the fabric. When the woollen or other fabric was found to be sufficiently dyed, it was removed from the vat and thoroughly dried, when the oxygen in the air brought out the blue colour.[2]

The woad vat of the Middle Ages, however, was not only used for the dyeing of clothes, but also supplied a blue pigment employed by artists, especially for the illumination of missals. This pigment was obtained

[1] According to Barral and Sagnier (*Dictionnaire d'Agriculture*, 1900, iv, p. 51) young woad leaves supply a light blue, maturer leaves a darker blue, and fully ripe leaves a bluish black colour. The quantity of woad introduced into the vat and the length of immersion, however, have more influence on the colour than the maturity of the leaves.

[2] Schreber suggests that the garments of the High Priest at Jerusalem, and more especially 'the robe of the ephod all of blue', referred to by Moses (Exod. xxviii. 31), may have been dyed with woad. He further quotes Harenberg's statement (*Museo Bremensi*, ii, p. 298) that this blue colour was very probably derived from glastum or woad. There is much difference of opinion on the subject. Cf. D. G. Schreber, *Beschreibung des Waidtes*, 1752, p. 130 n.

from the scum that floated on the surface of the woad vats and was known as the 'flower' of woad.

Ruellius thus describes the method of obtaining the scum:

'They crush the green plant in mills so as to expel the vegetable juices; then when the moisture has been removed they make the woad up into large balls, and these they allow to lie on the floor and decay until they fall into powder. In many places they call woad "pastel", from the loaf-like shape into which the woad balls are made up. They heat the powder derived from these balls in the vats of dyers' shops, and dip woollen cloths and skins therein, so that they may absorb the blue colour. The blue scum floating on the surface, which the vats throw up when heated on the fire, our dyers call indigo; this they dry for the use of painters.' [1]

The subject will be discussed further in Ch. xiii.

B. THE MODERN WOAD VAT

Woad is now no longer used as a direct dye, its place having been taken by natural and synthetic indigo, which yields similar but brighter colours and can be placed on the market at a lower cost. In fact commercial woad as now prepared and fermented no longer contains any dye, this having been destroyed by bacterial action. Nevertheless, woad is still employed as an adjunct in the apparatus known as the 'woad vat', in which natural or artificial indigo is used for the purpose of dyeing fabrics.[2]

Natural indigo contains between 30 and 70 per cent. of the indigo-blue dye-stuff known as indigotine, which

[1] J. Ruellius, *De Natura Stirpium*, 1536, Bk. ii, p. 574. Cf. also *J. Brit. Archaeological Assoc.* ix (1903), p. 99.

[2] The term 'woad vat' is now somewhat of a misnomer; 'indigo-woad vat' would be preferable.

is, however, insoluble in water and in that form is therefore useless for dyeing purposes. The object of the so-called 'woad vat' is to convert this insoluble blue indigotine into an alkaline substance called indigo white, which is the soluble form of indigotine that alone can be used by the dyer. Woollen fabrics which have been immersed in a solution of indigo white and are then exposed to the oxygen in the air assume the well-known indigo-blue colour. Woad assists the fermentation process which converts blue indigotine into indigo white.[1]

The process of conversion is based on the fact that certain vegetable substances, when undergoing fermentation in a liquid containing insoluble blue indigotine, change the latter substance into soluble indigo white. The vegetable ingredients must of course be introduced in suitable proportions, which vary with the nature and with the shade of the colour that is required.[2]

When the various organic substances are allowed to ferment, glucose is formed, which acts on the indigo contained in the alkaline liquor as a reducing agent. The sugar is oxidized by the latter and converted into lactic and then into butyric acid. The following description of a woad vat may serve as a type:[3]

[1] Various substitutes for woad have been tried such as cabbage and rhubarb leaves, turnip tops, and weld. Fermentation is, however, more steadily maintained by woad than by any of these substitutes. (Ure, *Dictionary of Arts, Manufactures and Mines*, 1863, ii, p. 517.)

[2] The Receiver of the Metropolitan Police states that woad is still used in conjunction with indigo for dyeing the blue cloths and serges worn in the service. Cloth dyed in the woad vat is also used in the British army, navy, and postal services, as well as for the uniforms worn by chauffeurs, hall porters, &c. Moreover, in former years the Prussian blue worn by German regiments was obtained from the same vat, which is said to render cloth more resistant to the action of strong sunlight, rain, or salt water.

[3] G. Martin, *Industrial and Manufacturing Chemistry*, 1918, i (Organic), p. 555.

A vat frequently employed is one with a capacity of 1,500 litres, which is filled with water and heated up to 65° C. Then 500 kg. of woad are introduced, the mixture being kept well stirred. The next day 20 kg. of finely ground indigo are added together with 20 kg. of bran, 7 kg. of madder, and 12 kg. of lime. The whole mixture continues to be stirred two or three times a day, while each time 1–2 kg. more of lime are added, the temperature of the liquid being maintained at *c.* 60° C. In the course of a few days the liquor in the vat assumes a yellowish colour, as a result of the formation of indigo white, and in this the woollen or other material to be dyed is immersed and moved about for one to six hours, according to the depth of blue required.

As soon as this immersion stage is complete the woollen material is passed between rollers (which remove all traces of liquor) and is exposed to the air, when by a process of oxidation the indigo white is converted into indigotine and the blue colour is developed.

Meanwhile the following processes have been taking place in the vat.[1] The woad, in conjunction with the indigo and assisted by the presence of bran and of madder, has excited lactic and butyric fermentation, causing the evolution of nascent hydrogen, the essential bacterium concerned in the process being the *Desmobacterium hydrogeniferum*.[2] Under the influence of the nascent hydrogen the insoluble blue indigotine has been completely reduced and converted into soluble indigo white, while the vat liquor has assumed a yellowish

[1] A fuller description of the woad vat will be found in Thorpe, *Dictionary of Applied Chemistry* (1912), ii, p. 293.

[2] According to the recent researches of Wendelstadt and Binz both bacteria and yeasts take part in the fermentation process. (*Berliner Berichte*, 1906, p. 1627.)

colour. The material to be dyed when first immersed takes on the same colour. As soon, however, as it is exposed to the oxygen in air its colour changes from yellow to green, and finally to the blue colour of indigo. Thus the dye-stuff penetrates the woollen or other fibres at the very moment of its formation.

The object of the lime in the woad vat is to control any excessive fermentation and thus preserve the alkaline reaction of the liquor in which the indigo white is dissolved, more or less lime being used as occasion requires. On the other hand, fermentation, if sluggish, can be accelerated by additions of bran and by raising the temperature.

Insoluble indigotine, $C_{16}H_{10}N_2O_2$, has the following chemical constitution:

By the action of reducing agents, however, it is converted into indigo white, $C_{16}H_{12}N_2O_2$, containing 2 atoms more of hydrogen, and readily soluble in alkalies. On exposing the alkaline solution to the air, the indigo white gives off the 2 atoms of hydrogen and forms water, H_2O, being rapidly oxidized back into indigotine which is deposited in the woollen fibres.

Synthetic indigo may also be used in the woad vat, but the process of its reduction proceeds much more slowly than in the case of natural indigo. In fact synthetic indigo takes two or three times as long to undergo reduction as does natural indigo. Moreover, it dyes a very thin blue colour, as it only contains pure indigotine.

Natural indigo, on the other hand, apart from its indigotine, includes a small percentage of indigo red or indirubin and indigo brown, which both by day and by artificial light give it a beautiful rich shade with which no other blue can compare.

When once the woad vat has been 'set', it merely requires replenishing from time to time by fresh supplies of indigo, lime, and bran. It may then remain in continuous use for many months. As the dyer can only use the top-clear liquor, and the constant addition of lime and bran in time prevents the sediment from separating, the operation is eventually arrested.

In the process of dyeing two mediums are required, the colouring agent and the mordant which fixes the dye on the fibre that is to be coloured. The method of mordanting wool depends on the property that fibre possesses of decomposing metallic salts and fixing upon itself an insoluble metallic compound when heated in their solutions. This compound probably consists of a combination of the metallic oxide with the wool-substance, which has the character of an amido-acid.

Woaded greens and woaded blacks are the names given to various materials dyed blue in the woad vat and then mordanted with certain chemicals.[1] In the case of the woaded greens, the mordant used is bichromate of soda, the materials being afterwards dyed green by means of a yellow dye-stuff such as fustic or alizarin yellow. In the case of woaded blacks, the fabric is first

[1] The term 'woaded' is also at times used commercially for materials that have been dyed in the indigo vat without any addition of woad. Cf. Knecht, Rawson, and Loewenthal, *Manual of Dyeing*, 1910, i, pp. 320–3. This volume gives a full account of the woad vat.

of all dyed an indigo blue in the woad vat; then boiled with logwood, and lastly fixed by the addition of copperas or ferrous sulphate.

Although of recent years the woad vat has to a large extent been abandoned, there are still some firms that retain its use for dyeing purposes. Amongst them are the Yorkshire Indigo, Scarlet & Colour Dyers Ltd., Manor Road Mills, Leeds; and Messrs. J. Compton, Sons & Webb Ltd., Old Ford Road, London. As recently as 1902 one firm kept as many as twenty-seven woad vats at work.

C. THE LEGEND OF ST. CIARÁN

Some curious superstitions have prevailed in connexion with woad dyeing. Thus in Ireland it was formerly supposed to be unlucky to dye cloth with woad or *glaisín*, as the Irish called it, while a man or boy was in the house. The following legend in the life of St. Ciarán illustrates this ancient superstition.

One day, while St. Ciarán was still a boy and at home, his mother, who believed in the old superstition and was about to dye some cloth with *glaisín*, said to him 'Out with thee now, Ciarán!' Ciarán left the house in a mischievous temper, saying: 'I hope, mother, that there will be a dark grey stripe in your cloth.'

Lo and behold, when the cloth was taken out of the vat every piece was found to be ruined by a dark grey stripe running through it. A fresh supply of *glaisín* was now prepared by the mother and some more cloth boiled in it as before. This time, owing to some other words uttered by Ciarán, the cloth came out white instead of blue and was also useless.

A third supply of *glaisín* was now prepared, when the

others to bacterial action during the processes of fermentation. The result is that woad is no longer used in the woad vat as a source of dye but merely for the sake of an enzyme which promotes fermentation as described in Ch. iv.

It was not until the early 19th century that attempts were made to extract the pure pigment from the woad leaves, and at first these attempts proved unsuccessful, so that at one time Dr. C. B. Plowright, after many trials, declared that 'indigo was absent from our woad'.[1]

Molisch, however, has recently devised a method of demonstrating the presence of indican in the leaves of woad.[2] His method consists in keeping the fresh leaves in a closed vessel filled with ammonia gas for twenty-four hours, and then transferring them for another twenty-four hours to a vessel filled with absolute alcohol. The ammonia precipitates the indican in the leaves and converts it into indigo which is insoluble in the alcohol, while the alcohol dissolves out the chlorophyll.

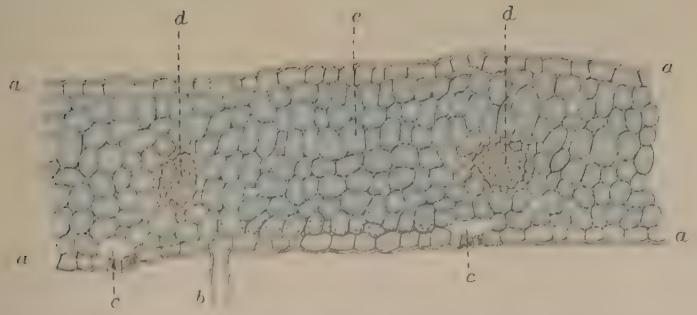
If the leaves after being so treated are cut into sections and mounted in balsam the precipitated indigo can be seen deposited in the chlorophyll-bearing tissues, while it is absent from the fibro-vascular bundles, the hairs, and the epidermis, excepting the guard-cells of the stomata. The demonstration succeeds best with very young leaves, i. e. those not more than an inch long (Pl. xvi).

Further, the quantity of indican [3] varies much in

[1] *J. R. Horticultural Soc.* xxvi (1901–2), p. 35.

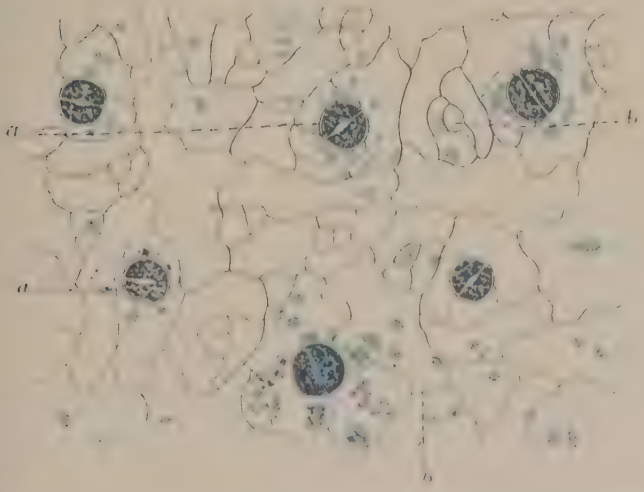
[2] H. Molisch, 'Ueber das Vorkommen von Indican im Chlorophyllkorn der Indicanpflanzen', *Berichte der Deutsch. Botan. Gesellsch.* xvii (1899), p. 228; C. B. Plowright, *Nature*, lxi (1899–1900), pp. 331, 563.

[3] There has been some discussion as to whether the blue dye derived



A. Transverse section of a very young leaf of *Isatis tinctoria* L., after being tested for indican with ammonia vapour.

The epidermis (*a*) and a hair (*b*) are free from indigo, while the guard cells (*c*) and the vascular bundles (*d*) show only a trace of the dye. On the other hand, the mesophyll cells (*e*) and especially the chlorophyll granules are rich in indigo (*c.* $\frac{210}{1}$).



B. Epidermis of a very young leaf of *Isatis tinctoria* L., after being tested for indican with ammonia vapour.

The chlorophyll-holding guard cells (*a*) show an abundance of indigo, while the adjacent cells have much less of the dye. The immature guard cells (*b*) usually have neither chlorophyll nor indigo (*c.* $\frac{210}{1}$).

WOAD LEAF: DEPOSIT OF INDIGO

different leaves. Some turn a beautiful blue, while others show only a faint trace towards the base of the leaves. As a rule the younger the leaf the more indican it contains.[1]

Beijerinck's process of separating the indigo is more delicate, and requires certain precautions, although the method is simple enough in itself. The woad leaves are put into a wide-mouthed bottle, which is then filled with hot water and stopped up so as to exclude air-bubbles. In a few hours, the water assumes a pale yellowish tint with a green fluorescence. On the addition of a caustic alkali it darkens and turns greenish. If a dilute acid is now added the indigo is thrown down as a blue precipitate. Beijerinck states that in the month of September he obtained 0·09 per cent. of pure indigo blue from plants grown in Holland.[2]

In order to determine the quantity of indican in woad grown at Parson Drove, experiments were made with woad leaves picked from plants of various ages. Half a kilogramme of leaves at the respective ages of 28, 30, 34, and 66 days was found to yield respectively 1·5, 2·4, 2·1, and 0·6 grammes of impure indigo.

Plowright has proved that the indican can be extracted from woad in about twelve hours, by using an eight-gallon vat and a mixture of woad, weld, bran,

from woad is identical with that obtained from the tropical Indigoferas. Cf. M. Fort and L. L. Lloyd, *The Chemistry of Dyestuffs*, 1917, p. 294; A. G. Perkin and A. E. Everest, *Natural Organic Colouring Matters*, 1918, p. 525; G. Martin, *Industrial Chemistry*, 1918, i, p. 554.

[1] Beijerinck considers woad an indoxyl plant that always yields an indoxyl solution either in hot or cold water, but the air must be kept excluded, as this indoxyl is readily oxidized and converted into indigo in alkaline solutions and the indigo blue is consequently lost.

[2] Beijerinck, 'On the Formation of Indigo from Woad'. (Summarized in *Nature*, lxi (1899–1900), pp. 71, 331.) Cf. also *J. R. Horticultural Soc.* xxvi (1901–2), p. 40.

madder, lime, and hot water, the vat being kept carefully covered, and periodically stirred. A skein of wool, after an hour's immersion in the liquor, turned a good blue on exposure to the air. Further experiments were then made on a smaller scale and proved that it was as easy to dye wool blue with our English woad to-day as it was 300 years ago. In fact any housewife could dye her wool as quickly now as it was done centuries ago.[1] Indeed it was only necessary to digest the woad at a temperature of from 100° to 140° F. (40° to 60° C.) for a prolonged period. Half a pound of woad (500 grammes) to a gallon (4 litres) of water was sufficient to yield good results. The water should be nearly boiling when poured on the woad, and the vessel must be closely covered and remain at the above temperature. In from ten to twelve hours small bubbles will begin to appear on the surface of the liquor. A little recently slaked lime (6 or 7 grammes) should now be stirred in, the effect of which will be to generate an ammoniacal odour. A small pattern of wool if immersed for an hour will turn pale blue on exposure to the air. After a few hours the addition of a gramme or so of bran will again set the fermentation going, which in its turn can be controlled by the addition of lime. In this way the dyeing process may be kept in operation for several days.[2]

The longer and more often the patterns are immersed the darker they grow. The first specimens will be pale blue, the later ones will be dark blue, indeed almost black. As the paler shades are apt to have a greenish

[1] *Nature*, lxi (1899–1900), pp. 331, 563.

[2] A. v. Resch, in his *Sieg des Waid-Indigo über den Ausländischen Indig*, 1812, exhibits some specimens of coloured fabrics dyed with woad. There are also samples of yarn and cloth dyed with woad in the Museum of the Royal Botanic Gardens, Kew.

tint, a small quantity of madder was formerly added in order to avoid the greenish tint.

As woad contains but a small quantity of indican, experiments made with less than half a pound of leaves are not likely to be successful. One important rule, moreover, is to keep the temperature at about 100° F. for many hours.

B. PRIMITIVE METHODS OF EXTRACTING INDICAN

The interesting question arises: how did the ancient Britons dye themselves with the pigment which gave them 'a terrible aspect' when Caesar invaded the country?

Plowright has suggested four possible ways in which this may have been done:

(1) By infusing fresh young woad leaves in hot water, adding wood ashes,[1] and then washing themselves with the liquid.

(2) By adding an excess of lime water or by slaking quick-lime in the infusion. In this way they might dye themselves a green colour.

(3) By rubbing themselves with the juice of the woad plant. In this way they might dye their skin as black as the 'woadmen' still dye their hands when they are cropping and balling woad.

(4) By infusing woad plants in hot water, adding some lime water, and then drying the precipitate they might obtain nearly pure woad indigo, with which they could either tattoo themselves or smear their bodies with the help of oil.

It is probable, however, that they first of all produced

[1] These ashes contain a crude alkali and would neutralize any excessive acidity in the vat.

a crude form of woad vat, and then tattooed their bodies with the scum which rose to the surface of the liquor during the process of dyeing. This was doubtless the process by which the chalk referred to by Pliny was stained blue, and by which the mediaeval artists obtained their paint.

An even simpler plan, as Dr. Plowright has also suggested, would be to infuse a sufficiency of woad leaves in hot water and keep the mixture hot all night on the hearth. The addition of some quick lime to the hot water would yield some crude form of dye.[1]

H. Molisch [2] has carefully studied the deposition of indican in the young leaves of woad and finds that the indican is mainly deposited in the chlorophyll granules of the green cells (see Pl. XVI). The indican is most readily converted into indigo blue by the use of fumes of ammonia. The experiment succeeds best if young leaves about 3–5 cm. in length are chosen and as soon as picked are placed in a glass cylinder (*c.* 15 cm. high and 5 cm. wide with a ground glass stopper) at the bottom of which is a small open vessel filled with ammonia. This liquid fills the cylinder with fumes which penetrate into the tissues, fill the cells, and thus immediately convert most of the indican into indigo.

The leaves are left exposed to the fumes for twenty-four hours, and then transferred to absolute alcohol for twenty-four hours, so as to allow of the extraction of the chlorophyll. When the chlorophyll has been removed, the presence and distribution of the indigo blue are at once shown by the blue dye which has replaced the indican.

[1] *J. R. Horticultural Soc.* XXVI (1901–2), p. 40.

[2] H. Molisch, 'Ueber das Vorkommen von Indican im Chlorophyllkorn der Indicanpflanzen', *Berichte der Deutsch. Botan. Gesellsch.* XVII (1899), p. 228, Pl. XVIII.

C. WOAD IN COMBINATION WITH OTHER DYES

The woad vat was frequently used in the production of other colours apart from blue, the woad in such cases usually supplying the ground colour, while the other dyes were used subsequently, or several dyes might be used simultaneously. A great variety of shades could thus be obtained.

A favourite combination was woad with madder, which gave a rich dark blue or black. Those two dyes were first of all boiled in a copper cauldron, and then introduced into the woad vat, to which some bran and slaked lime were added. When that mixture had fermented for some hours, the fabric to be dyed was immersed in the solution and emerged as a green colour, which at once turned a more or less deep blue or black on exposure to the air, according to the proportions of the dyes introduced into the vat.[1]

Another method of obtaining a black was to immerse the fabric in the woad vat and then to transfer it to a cauldron containing logwood and nut galls. Some copperas and sumach were also frequently added.[2]

When woad was used in conjunction with a yellow dye a green colour resulted, which might be obtained in many shades.[3] The woaded fabric was first boiled in alum and tartar, and then dyed with weld or other yellow dye.

[1] *The Art of Dyeing Wool, Silk and Cotton*, trans. by Hellot, Macquer, and D'Apligny, 1901, pp. 22 f., 153, 157.

[2] T. Fuller, 1608–61 (*The Worthies of England*, 1840, iii, p. 87), writes thus of the use of woad in combination with other colours: 'Our dyers make much use of woad, being *color ad colorem*, the stock whereon other colours are grafted. Yea, it giveth them truth and fruitfulness, who without it prove fading and hypocritical.'

[3] The well-known saxon green was originally obtained by dyeing fabrics blue with woad and afterwards yellow with weld. At a later date tropical indigo was substituted for woad. Cf. M. Postlethwayt, *Universal Dictionary of Trade and Commerce*, 1766, *sub* Saxon.

Woad used in combination both with red and yellow produced a reddish olive or a greenish grey tint. The usual plan was to begin with the woad vat and afterwards to boil the fabric in the two other dye solutions successively, madder being used for red, and weld or a similar dye for a green colour.

Various red, purple, and violet colours could also be obtained by combining woad with suitable dyes. For example, if a fabric that had first been woaded was then boiled with alum and tartar, it could be dyed with one of the red dyes such as kermes, cochineal, or madder. Kermes was much the most costly and was therefore reserved for valuable fabrics. Cochineal and madder produced somewhat similar results at a lower cost.

These few illustrations will suffice to show how the woad vat assisted in the production of a great variety of other colours, apart from blue.[1] Fancy shades were obtained by a process of double dyeing, and apparently were not always reliable, as appears by a statute passed in 1533, which ordered that none should dye woollen cloth 'as browne, blewes, pewkes, tawnyes, or vyolettes', unless they were 'perfectly boyled, greyned, or madered upon the wode (woad), and shotte with good and sufficient corke or orchall'.[2]

[1] Exhibits of woad and of textiles dyed with it are extraordinarily rare in museums, considering the high importance of this dye in mediaeval times. In France no museums in the Toulouse or in the Somme district appear to possess any specimens. In Germany and Italy also they are rare. In England the Museum at Kew, the British Museum (Nat. Hist.), the Wellcome Historical Medical Museum in London, and the Museums at Cambridge, Guildford, Reading, Wisbech, and King's Lynn possess specimens of woad and sometimes also of dyed textiles, woad-spuds, &c. Since this was written Dr. Hurry's collections of woad and woad products have been presented to various museums.

[2] Statutes of the Realm, 24 Hen. VIII. Cf. also 4 Edw. IV.

A brief *excursus* may be permitted in order to deal with the colour of the clothes worn in the early Middle Ages, with special reference to woad. These colours were chiefly white, black, brown, grey, blue, red, and yellow. Black, brown, and grey, and to a certain extent white, could be obtained from natural wool.

Woad, when used alone, supplied various shades of blue; in combination with other dyes it also gave many different colours. Indeed, woad might almost be described as 'the universal dye of the Middle Ages', of which more was required than of all the other dyes combined.[1]

The poorer classes usually wore clothes of the natural colour of wool, for dyed cloth was more expensive and therefore implied some degree of prosperity.[2] Woad, moreover, owing to the complexity of its manufacture, was never a cheap dye. Woad afforded a fashionable colour and was also in great favour for its durability in sunny as well as in wet weather.

Garments dyed with woad were also worn by special sections of the population. Thus the 'blue-coat' was the habit of the serving-man in the 16th and early 17th centuries, the same garment also forming the dress of a beadle in the days of Shakespeare. The well-known blue uniform of Christ's Hospital boys dates from the time of Edward VI, who founded the school, although woad is no longer used in the dyeing of the cloth.

Certain colours appear to have been fashionable at different seasons of the year as they are to-day, and this would doubtless create a seasonable demand for the special dyes.[3]

[1] F. Lauterbach, *Der Kampf des Waides mit dem Indigo*, 1905, pp. 9, 14.

[2] Garments woven out of flax or hemp were usually grey.

[3] A list of cloths made in York in 1395–6 throws light on the colours generally worn. Cf. Exchequer, K. R. Accounts, 345, No. 16. Cf.

Blue, i.e. woad fabrics largely predominated during the months September to December, while for some mysterious reason they almost disappeared from January to May, being then replaced by russet or reddish fabrics. Red, sanguine, morrey (orange), plunket,[1] green, and motleys white, blue, green, and rarely black were other colours in vogue.

also L. F. Salzmann, *English Industries of the Middle Ages*, 1913, p. 147.

[1] Plunket appears to have been a pale blue which required only half the quantity of woad needed for azures; the latter in turn only needed half the amount required for the darkest blues. (*Victoria County History of Suffolk*, ii, p. 258.)

CHAPTER VI

THE WOAD INDUSTRY IN GREAT BRITAIN

THE use of woad as a source of blue dye in Great Britain goes back to pre-Christian times and extends over wellnigh two thousand years. Space will only permit of a brief survey of the subject, which may be discussed under the following divisions:

A. EARLY HISTORY.
B. DEVELOPMENT OF THE INDUSTRY.
C. WOAD DISTRICTS.
D. THE HANSE OF LONDON.
E. 'THE WOAD MERCHANTS OF CANDELWYKSTRETE.'
F. WOAD REGULATIONS.
G. THE NAVIGATION ACTS.
H. 'THE OLD ORDER CHANGETH.'

A. EARLY HISTORY

One of the earliest incidents recorded in English history is the fact that the ancient Britons stained themselves blue with a plant called woad. In Julius Caesar's *De Bello Gallico* (54 B.C.) we read:

'All the Britons, without exception, stain themselves with woad (*vitrum*), which produces a bluish stain, and this gives them a wild look in battle.' [1]

Pliny, the Elder (*c.* A. D. 23–79), probably also alludes to woad (*glastum*) in the following passage:

'There is a plant like plantain, called in Gaul *glastum*, with

[1] T. R. Holmes, *Caesar's Commentaries on the Gallic War*, 1908, p. 136. The original runs: 'Omnes vero se Britanni vitro inficiunt, quod caeruleum efficit colorem, atque hoc horribiliore sunt in pugna adspectu.'—Book v, xiv.

which the wives and daughters of the Britons smear their bodies in certain ceremonies and go naked, being of the colour of the Ethiopians.' [1]

Pliny evidently knew that woad was capable of yielding a blue dye, since he refers elsewhere to true indigo being adulterated by chalk and pigeon's dung stained with woad.[2]

Ovid (43 B.C.–A.D. 17) describes our ancestors as the 'green Britons', *virides Britannos*, probably alluding to the dye with which they painted their bodies.[3]

Pomponius Mela (*c.* A.D. 43), the earliest Roman geographer, confirms what Caesar says in regard to the use of woad by the Britons. 'They dye', he says, 'their bodies with woad (*vitrum*), but whether for ornament or any other reason is not known.' [4]

Lastly Herodian, the historian, speaks of the ancient Britons as being ignorant of the use of clothes, and adds:

'They mark their bodies with various figures of all kinds of animals and wear no clothes for fear of concealing these figures.' [5]

Thus various ancient authors refer to woad as the dye used by the Britons,[6] although Caesar says that it was

[1] Pliny, *Natural History*, xxii, 2. *Glastum* was the name given to woad in the time of Pliny, and was derived from the Celtic *glas*, meaning blue.

[2] Pliny, l.c., xxv. 6, 27.

[3] Ovid, *Amorum*, Bk. II. xvi. 39. [4] Pomponius Mela, ii. 1.

[5] Herodian, iii. 47. Our ancestors probably tattooed their figures by puncturing the skin and introducing woad dye into the puncture.

[6] Various English poets have referred to this early stage of our civilization.

Thus: *Chaucer* (Former Age, 17):

'No Madyr welde or wod no litestere He knew.'

Milton (History of Britain, Bk. ii), describes our ancestors as having:

blue, Pliny that it was black, while Ovid describes our ancestors as green, without specifying the pigment used.[1]

In Anglo-Saxon times many references to woad occur in literature, as we shall see in greater detail in Ch. xvi. Thus we read of 'woad hill', 'woad land', 'woad house', 'woad valley', 'woad district', &c.[2] The plant was evidently grown in various English counties. The mode of

'Their bodies most part naked, only painted with woad in sundry figures.'

Garth (Claremont, 91, *c.* 1715) wrote about the days:

'When dress was monstrous and fig-leaves the mode,
And quality put on no paint but woad.'

Tennyson (The Princess, ii) has the lines:

'then the man,
Tattoo'd or woaded, winter-clad in skins.'

[1] Some doubt has at times been expressed as to whether the plant used by the ancient Britons was the herb now known as woad (*Isatis tinctoria*) or some other dye plant. The doubt has sprung from the fact that woad is rarely found growing wild in this country and is almost certainly not a native. If the ancient Britons dyed themselves with it, they probably must have had it in cultivation. Further, another plant, viz. weld (*Reseda luteola* L.), has long been in use as the source of a yellow dye, and in some parts of the country is called woad. A third plant, viz. dyer's weed (*Genista tinctoria* L.), yielding a yellow pigment, has also in Yorkshire been termed 'woad' or 'woad-waxen'. But the fact that the British dye is so specifically described by Caesar as blue leaves little room for doubt that *Isatis tinctoria* was its real source. The Celts may either have brought the plant with them as they spread westwards over Europe, or have obtained the seeds from the East. Britten and Holland (*Dictionary of English Plant Names*, 1886, p. 498) give the name woad to all three plants: *Isatis tinctoria*, *Reseda luteola*, and *Genista tinctoria*.

[2] According to some authorities the word 'Britain', the oldest national name for England, is associated with woad paint. Thus Dr. Guest (*Origines Celticae*, 1883, ii, p. 3) regards the word Britanni as originally the latinized form of the Welsh word Brython (Bryth=paint) and as signifying 'the painted men'. In other words the Britons were so called because they painted themselves. In this connexion it is interesting to recall that in two North-Staffordshire barrows recently excavated, one at Sheen and the other at Leek, the actual woad or blue dye which our forefathers used in prehistoric times has been found stored up. (W. Beresford, *Memorials of Old Staffordshire*, 1909, p. 2.)

cultivation was very primitive in those far-off days, when scientific agriculture was still unknown. The dye extracted from the leaves was probably trivial in quantity and crude in quality. The artistic taste of our forbears, however, was not exacting.

The supply of woad appears in early times to have been insufficient for the demand. At any rate we read that our Saxon forefathers imported woad in order to dye their home-spun cloth or wadmaal.[1]

B. DEVELOPMENT OF THE INDUSTRY

An interesting allusion to woad occurs in a document describing the duties of a reeve and giving some details of 11th-century farming:

'In May, June and July one may harrow, carry out manure, set up sheep hurdles, shear sheep, do repairs, hedge, cut wood, weed and make folds. In harvest one may reap; in August, September and October one may mow, set woad with a dibble and gather home many crops, &c.' . . . 'In spring one should, if the weather permit, set madder, sow flax and woad seed.'[2]

This quotation proves that the cultivation of woad was a recognized operation in agriculture, although there is no evidence that the plant was grown on any large scale at this early period. The woad farmers or woadmen, as they were called, roamed about the country, and as soon as one district became exhausted sought fresh land for their crops. Most of the woad required by dyers was still imported. Such importation is referred to during the reign of Henry II, when Fitz-Stephen enumerates some of the articles that were imported into England during that reign, including

[1] Sowerby and Johnson, *Useful Plants of Great Britain*, 1862, p. 23.
[2] W. H. R. Curtler, *Short History of English Agriculture*, 1909, p. 17.

'spiceries, jewels, silks, furs . . . and some woad for dyeing'.[1]

During the 13th century large quantities of woad were also imported into this country in order to supply the growing demand for a blue pigment with which to dye the cloth manufactured in England. In 1213 the duties paid on woad imported from foreign countries amounted to nearly £600, and this sum included only the woad imports entering through a certain number of ports, viz. those of Kent, Sussex, Yorkshire, Lincolnshire, Norfolk, Suffolk, Essex, and Southampton in Hampshire.

During the reign of Henry III the exportation of wool, the chief staple of the country, was temporarily prohibited, Parliament in 1261 ordaining that no woollen clothes should be worn except such as had been manufactured in England. This was done in order to encourage the manufacturers of cloth at home, instead of English wool being worked up in Flanders and France, and then sent back to England to be sold as cloth. This prohibition led to great interference with the importation of commodities from abroad and resulted in a great scarcity of woad.[2] The supply of coloured woollen clothes which had been the fashion proved insufficient, with the result that many persons substituted garments of the natural colour of wool. Happily the prohibiting of wool exports did not last for many years, the interference between the English producers of wool and the Flemish manufacturers of cloth being found intolerable to both countries.

[1] W. Fitz-Stephen, *Libellum de situ etc. . . . Londini*, quoted by G. L. Craik, *History of British Commerce*, 1844, i, p. 105.
[2] G. L. Craik, *History of British Commerce*, 1844, i, p. 127.

By the close of the 13th century large quantities of woad were again entering the country, a lucrative traffic having been established between Picardy and London. Important conventions were drawn up between foreign woad merchants and the woad merchants of London and Norwich, which throw much light on the woad trade between the two countries and to which a special section will be devoted (p. 71). Various public enactments were passed at this period to secure that woad was to be the only pigment used for dyeing woollen cloth.

A serious quarrel occurred during the 13th century between the English weavers and dyers in which woad played a prominent part. For a long time the weavers appear to have had almost complete control of the dyeing industry. They even possessed the right to dye their cloth with any pigment they chose with the single exception of woad, and the Queen Regent, Blanche of Castile, had actually added to this right the further privilege of using woad in two specially favoured workshops.[1]

This privilege naturally aroused the ire of the dyers, whose first Ordinances in 1268 record a protest against this encroachment on their rights, which is declared to be 'against God, against right and against reason, and especially and expressly against the king and his righteousness'. If the weavers were entitled to encroach on the dyers' trade, why might not the dyers encroach on the weavers'? Nor was this a mere veiled threat on the part of the dyers, for a few years afterwards some of the latter actually set up looms in their own houses. This act the weavers declared to be an invasion of their rights,

[1] A good summary of this quarrel is given by G. Unwin, *Industrial Organization in the 16th and 17th Centuries*, 1904, p. 33.

and as a reprisal they refused to supply the dyers with any cloth. In order to settle the quarrel an inquiry was made into the practice prevalent in other 'good towns where drapery was made', and eventually the king ordered that neither weavers nor dyers should meddle with one another's trade.

The various Guilds, such as that of the dyers, seem at times to have been governed by the wealthier members and to have excluded poor craftsmen who themselves laboured at their trade. Thus we read that no one 'with dirty hands' or 'with blue nails', or 'who hawked his wares in the streets' might become a member of the Guild.[1]

During the long French wars which commenced in the reign of Edward III and lasted over a hundred years, the progress of agriculture came to a standstill and this country became greatly impoverished. Corn and wool, however, remained the chief products of the farmer, wool continuing to be 'the flower, and strength and revenue of England', and large quantities were exported to Flanders. Only small quantities of woad appear to have been grown at this period, the bulk of the pigment required for the dye vats being still imported.

Meanwhile, considerable quantities of Flemish cloth were imported into England, and this was both of a higher quality and was better dyed than the cloth manufactured at home, although English wool had formed almost the whole raw material. In course of time,

[1] L. Brentano, *English Gilds*, 1870 (E.E.T.S.), p. cvii. W. Cunningham, *Growth of English Industry and Commerce*, 1890, i, p. 179. Brentano states that similar ordinances occur in German, Danish, and Belgian Gild Statutes. The term 'Blue nails' doubtless refers to woad-stained nails.

however, England conceived the idea of working up its own produce and thus keeping in the country the large sums of money that hitherto had been sent abroad.

Attempts were made at first to solve the problem by prohibiting the exportation of English wool. This, however, did not prove satisfactory, but it revealed the fact that English weavers and dyers had not the skill required to produce the finest and best-dyed cloth. Eventually the government decided to introduce Flemish weavers and dyers, so as to increase the productive powers of the English cloth industry. Thus came about the great immigration of foreign artisans in the reign of Edward III.[1] These artisans were chiefly Flemish weavers, dyers, and fullers. The dyers were doubtless mainly woad dyers, for it was specially in dyeing with woad that at this period English craftsmen were inferior to their rivals on the Continent.[2] These Flemish

[1] Apparently Edward II had planned, although he did not carry out, the settlement of alien weavers in England. But the foreign manufacturers were so alarmed by his proposal that they attempted to buy up all the materials and dyes used in the manufacture of cloth, so as to prevent a revival of the cloth industry in this country. Thus we read in 19 Edw. II, 1326, that the Flemings, Brabantes, and other aliens were discovered suddenly 'buying throughout the land all the teasels they could find and also buying butter, madder, woad, fuller's earth, and all other things that pertain to the working of cloth, in order that they may disturb the staple and the common profit of the realm'. Twenty tuns were already shipped and ready for going beyond sea, when the export was stopped. (*Close Rolls, 1323–7*, p. 565; H. T. Riley, *Memorials of London and London Life*, 1868, pp. 149, 150.) Again, in the reign of Edward III, we read of carding-thistles, butter, madder, woad, and fuller's earth as articles exported from this country, the export of some of them being forbidden from time to time. (*Liber Albus*, ed. by H. T. Riley, 1859, p. xcv.)

[2] The inferiority of woad dyeing in England as compared with that in Flanders and France is well described by W. Cholmley, *The Request and Suite of a True-hearted Englisheman*, 1553. Cf. *The Camden Miscellany*, 1853, ii, ed. by W. J. Thoms, pp. 7 f.

artisans gave a great impulse to English cloth manufacture, and especially to manufacture for export.

The following table shows the imports and exports of woad that passed through Southampton during the two years 1428 and 1430. The imports are much larger than the exports.

TABLE SHOWING THE IMPORTS AND EXPORTS OF WOAD TO OR FROM SOUTHAMPTON HARBOUR DURING THE YEARS 1428 AND 1430

Description.	*Year.*	*Import.*	*Export.*	*Origin or Destination.*
		bales	*bales*	
Woad	1428	2534	—	Genoa
„	„	—	838·5	London, &c.
„	1430	*c.* 4149	—	Genoa, Florence, Netherlands
„	„	—	*c.* 857·5	London, Flanders, Exeter, Shoreham [1]

A famous poem, entitled 'The Libel of English Policy', written *c.* 1436 and published by Hakluyt, gives an interesting review of English Commerce in the early 15th century.[2] Reference is made to the Genoese who came to England in great carracks, to purchase 'wool and woollen cloths of all colours . . . great quantities of woad, wool, oil, wood-ashes, cotton, alum, &c.'

These references point to a very active trade in

[1] P. Studer, *The Port Books of Southampton*, 1913, p. 130.

[2] D. Macpherson, *Annals of Commerce*, 1805, i, p. 651; G. L. Craik, *History of British Commerce*, 1844, i, pp. 167, 168.

Woad appears also to have been used in Scotland. Sir Robert Umfraville, in an expedition to the Firth of Forth in 1410, carried off as prizes fourteen 'good ships' laden with 'woollen and linen cloth, pitch, tar, woad, meal, wheat and rye'. (Craik, l.c., i, p. 189.)

woad both for importation into and exportation from England.

Until the middle of the 16th century woad appears to have been cultivated in England in a somewhat desultory fashion, and the dyeing with woad appears to have been very inferior to that done in Flanders, Holland, and the adjacent countries. Indeed, partly for that reason and partly because of the inadequate woad supplies large numbers of undyed cloths were annually exported from Great Britain to be dyed and dressed, after which they were returned to this country and sold at a much higher price than cloths dyed at home.[1]

Efforts appear to have been made about this time to increase the production of woad by means of importation. Thus Hakluyt writes in 1582: 'Thus was woad brought into this realme, and came to good perfection to the great losse of the French our old enemies.'[2] Apparently as English woad became more abundant, less French woad was required.

Somerset was one of the active centres of the woad industry in the 15th and 16th centuries. Evidence of this may be found in Somerset wills,[3] in which bequests of woad dye as well as of the appliances concerned in its manufacture are common. For example, in 1481 Simon Lacy bequeaths his woad vat, while in 1500 Agnes Petygrewe, who owned a dye-house, bequeathed the

[1] An eloquent plea for the importation of Flemish woad dyers, in order to improve the English dyeing industry will be found in *The Request and Suite of a True-hearted Englisheman*, 1553, by W. Cholmley. (Cf. *The Camden Miscellany*, 1853, ii, pp. 5 f. Reprinted by W. J. Thoms.)

[2] R. Hakluyt, *Navigations and Voyages of the English Nation*, Everyman Library ed., iii, p. 94.

[3] *Victoria History of Somerset*, 1911, ii, p. 420. Cf. also *Somerset Record Society's Publications*, xvi, xix, xxi (F. W. Weaver, *Somerset Mediaeval Wills*). These volumes give many other references to woad.

same, together with 'le fatte (vat) and furneyse' and all things belonging thereto to John Peryn and Margaret his wife, whilst to the church of St. Thomas at Pensford and to that at Publow the testatrix gave to each one measure of woad.[1]

A Bristol bequest in 1498 contains the words: 'To my daughter a pipe of woad good and merchantable, of the real value of 20 marcs sterling, containing 16 measures, of Bristol measure, *secundum assaiam et probacionem con'silis gaide in eadem villa antiquit usitat*'.'[2]

In 1504 Thomas Upcot of Dunster left to his daughter Joan four bales 'de la ode'. In 1548 Margery Hill of Taunton made a bequest to her three grandchildren of a pipe of 'oode'. The Dunster Rolls of the 15th century contain several references to the pollution of the river with woad water, i.e. the ammoniacal liquor associated with the fermentation of woad.[3]

The immigration of alien weavers in the 16th century formed the second landmark in the history of the English cloth trade, just as the first landmark was associated with the influx of the Flemish weavers in the reign of Edward III. Even at the beginning of his reign Henry VII authorized the settlement of foreign clothmakers, and the protector Somerset in 1551 planted a colony of these foreign artificers, who were chiefly Flemings, at Glastonbury Abbey, where two houses were actually placed at their disposal within the monastery, while money was advanced them to buy wool and materials for dyeing, including woad, madder, and alum. These weavers, however, did not settle per-

[1] *Somerset Record Society's Publications*, xx.
[2] T. B. Wadley, *Bristol Wills*, p. 172.
[3] H. C. Maxwell-Lyte, *History of Dunster*, 1909, p. 298.

manently, and on the death of Edward VI in 1553, left the country.[1]

It was under Elizabeth, and especially in 1567, that the principal influx of Dutch and Walloon weavers took place. Owing to the cruelty of Duke Alva's administration the most skilful and industrious section of the people of the Netherlands decided to emigrate from their country, and crossed the Channel in tens of thousands, bringing with them their arts and industries. These exiles were welcomed by the British Government both as religious refugees and as a valuable accession to the economic resources of the nation. Indeed, they rendered England the priceless service of introducing a new branch of the woollen industry, viz. the manufacture and dyeing of superior fabrics known as the 'new draperies', many of which had hitherto been either unknown in this country or were beyond the technical skill of British textile workers. These refugees by their exceptional skill and knowledge enabled England to wrest various secrets of the woollen manufacturers from her rivals, to build up her industrial supremacy, and in time to become the market of the world. Not only did these foreign textile workers use the best methods of fulling and dressing cloth, but they were skilled in dyeing with the best colours, and especially with woad. No longer was the English public driven to import cloths which had been dressed and dyed in Ghent or in Bruges. Henceforth they could be clothed with material from looms and woad vats at their very doors.

The close of the 16th century appears to have been the golden era of the woad industry, for it was a period when large quantities of the dye were required by the

[1] E. Lipson, *History of the Woollen and Worsted Industries*, 1921, p. 20.

cloth manufacturers, while at the same time much French woad was also imported.[1] In the year 1586 was published an important article, entitled 'A briefe description of the true and perfitt makinge of woade, with a declaration of the apte grounde and soyle for that purposse'. This work gives an early account of the cultivation of woad.[2] It further describes the indispensability of woad to every person engaged in the production of coloured woollen cloths. This article was followed in 1587 by a Proclamation strictly regulating the woad industry. The sowing of the plant was forbidden except in strict moderation, and every woad farmer was required to pay 20*s*. per annum to the queen for the right to cultivate the plant. Woad might not be grown within five miles of any of the queen's residences, or of any city, market town, or thoroughfare. No grower might plant more than 20 acres in one year nor might more than 40 to 60 acres be cultivated in one parish. Woad moreover was not to be cultivated in any locality where there was a risk of depriving the poor of their accustomed work, or of its damaging fruitful ground.

[1] In 1579 the Privy Council was actually making inquiries through the dyers' company as to the possibility of substituting indigo from Muscovy and Persia for woad, as the indigo or 'anyle' might be had 'in great quantity from thence and far better cheape then woade is from here'. Cf. *Acts of the Privy Council*, xi, p. 147.

Hakluyt also refers to the high price of foreign woad, 'which devoureth yeerly great treasure', and to the desirability of trying to grow anil, i.e. indigo, in England, so as to bring down the price of woad and consequently of cloth.

A few years later (1586) he refers to 'Woad: a thing of so great vent and uses amongst English Diers, which cannot be yeelded sufficiently in our owne countrey for space of ground, [but which] may be planted in Virginia, there being ground enough'.—R. Hakluyt, *Navigations, &c.* (Everyman Library ed.), iii, p. 94; vi, p. 172.

[2] Lansdowne MS., No. 121 (*Victoria History of Somerset*, 1911, ii, p. 421).

Finally a register was to be kept of all growers of woad in the kingdom.[1] Forty acres planted with woad are said to have sufficed to keep a hundred and forty persons constantly at work, of whom the majority would probably be women and children.

This register and the associated licences seem to have been in force shortly afterwards, since in 1601 permission had been granted to two persons each to sow 600 acres with woad.[2]

Two years later, however, a fresh Proclamation was issued cancelling that of 1587, and permitting any persons to grow woad who wished to do so, 'Provided always that it shall not be lawful for any person or persons whatsoever to convert any ground that shall be within three miles of the Citie of London, or neere any of her Majesties houses of accesse, nor so neere to any other great Citie or Towne corporate, whereby any offence may grow by the noysome savour of the same'.[3]

[1] *Calendar S. P. Dom.* (vol. xxx), 1580–1625 (Elizabeth and James I, Addenda), pp. 207–8 (1587); 510–11 (1608).

This volume of State Papers gives an account of the Council (April 1587) at which the national policy as regards the growing of woad was discussed. The payment of 20*s*. per acre was intended to make up for the loss of customs. Moreover, regulations were drawn up which every woad-grower must observe.

[2] R. H. Tawney and E. Power, *Tudor Economic Documents*, 1924, ii, pp. 285–6, 295.

[3] About this period there is evidence of the early introduction into England of indigo, the future rival of woad, and even destined eventually to supplant it. In 1643 the king of Portugal sent Pero Vaz Devora to England in order to demonstrate the value of a dye called 'aneel', commonly called in English 'blue ynde, which cometh out of East Yndias and by repute is made of the flower and first croppe and cut on an herbe growing there whereof woade is made, not before this tyme practiced uppon wull or clothe in Englande'. Pero Vaz explained the method of using this indigo to some London dyers, who succeeded in obtaining 'perfite and durable colour of blue, azure, and watchette according to the nature of good woade'. These dyers certified that

A description of the cultivation of woad and of its dye, dating from the middle of the 17th century, is given by Blith, who, in referring to 'six newer peeces of improvement', refers to 'The planting (*sic*) Welde, Woad and Madder, three rich commodities for Dyers' . . . 'Woad is also a great commodity, it layes the foundation for the solidity of very many colours more, a woaded colour is free from stayning, and excellent for holding its colour; almost any sad holding colours must be Woaded.'[1]

Another 17th-century writer described woad as a 'very rich commodity', which more than doubled the rent of land devoted to its culture; the produce of an acre of woad was actually sold at from £6 to £20 a ton. Various writers on agricultural subjects about 1650 recommend farmers to grow woad, weld, madder, and saffron as specially lucrative crops.[2]

The prosperity of the woad industry at home at this period may explain the diminished importation of the dye from abroad. The year 1638 appears the last when woad came in from France, probably from the Toulouse district.[3]

During the 18th century a successful woad farm on modern lines was established by a Mr. J. Cartwright at Brothertoft farm near Boston.[4] The area devoted to woad comprised over 1,100 acres and sufficed to keep the woad

40*s*. of aneel yielded as much colour as 50*s*. of woade and gave a more oryent (i.e. brilliant) colour. Lansdowne MSS., xxiv, Art.66 (April 27, 1577). Cf. also J. S. Burn, *History of the French, Walloon, Dutch and other Foreign Protestant Refugees settled in England*, 1846, p. 258.

[1] W. Blith, *The English Improver Improved*, 3rd ed., 1653, p. 227.

[2] Lord Ernle, *English Farming Past and Present*, 1927, p. 136.

[3] Lewes Roberts, *The Merchant's Map of Commerce*, 1638, ii, p. 257; G. L. Craik, *History of British Commerce*, 1844, ii, pp. 44, 50.

[4] A. Young, *General View of the Agriculture of the County of Lincoln*, 1799, pp. 149 f.

mill regularly at work. By the efficient organization of this farm the migratory system was abolished and increased efficiency in the manufacture of woad dye was achieved.

The succession of crops recommended by Mr. Cartwright as a regular rotation was the following:

1. Woad.
2. Woad.
3. Woad (and on some of the best land, 4. woad).
4. Oats.
5. Oats.
6. Cole.
7. Oats.
8. Grasses: white clover, rib,[1] a small portion of trefoil, best hay seeds, parsley, and some ray[2] grass.

Under this rotation which extended over eight years, woad was grown for three successive years on the same ground, which in the other five years was devoted to oats, cole, and grasses. Only where the soil was exceptionally rich was woad sown on the same field for four successive years. At the end of eight years the whole rotation was repeated.

The following is Young's official report of the Brothertoft farm:

'Mr. Cartwright's buildings and machinery are all calculated for cropping 200 acres every year. Thus a tract of 980 acres would (without supposing woad for four years in any part) yield 210 acres annually; consequently Mr. Cartwright, having above 1,100 acres, has a power of leaving the grass much longer, if he should think proper.'

C. WOAD DISTRICTS

Various parts of England were noted for the cultivation of woad. Amongst them were Somerset and Lincolnshire.

[1] Probably ribwort plantain (*Plantago lanceolata*).
[2] Rye grass (*Lolium perenne*).

(*a*) *Somerset*

Woad was one of the chief agricultural products of Somerset, and to it the county owed the excellence of its 'azures' and 'plunketts'. Keynsham[1] near Bath, Wells, and Glastonbury were important centres. The abbeys of Glastonbury and Muchelney derived much wealth from woad.[2] Somerset was also one of the most flourishing centres of the cloth trade, which both stimulated, and was stimulated by, the production of large supplies of the most valuable dye-plant of the Middle Ages.

Another woad centre was at Mells, where a well-known character Harvey the Woadman owned a horse-mill for grinding and sheds for drying. The crop was a very profitable one, so lucrative indeed that few farmers

[1] J. Collinson (*History of Somerset*, 1791, ii, p. 400) writes: 'Great quantities of the herb called woad (the ancient *Glastum*, once peculiar to this county) are raised here for the purposes of dying.'

[2] *Victoria County History of Somerset*, 1911, ii, p. 420. Not only did some abbeys derive revenues from the cultivation of woad, but in certain cases the monks grew woad surreptitiously, partly as a relief from the tedium of the cloister, and partly as a source of private gain.

Thus we read in Alnwick's *Visitations of Ramsey Abbey in 1439* that: 'Brother Robert Eyworthe and John Burtone of St. Ives hire crofts and lands from lay-folk and sow them with woad and other seeds to their own profit, and not to that of the monastery or of the cell of St. Ives; for this Burtone did for this purpose destroy the saffron growing at St. Ives, and by reason hereof they are defamed of bargaining and private gain in the neighbourhood.'

. . . . . .

It was therefore ordered 'That the monks shall not hire fields or lands or sow them with any seeds, that by reason thereof they may have freedom to roam outside. For brother John Eywort did hire such lands and crofts in Ramsey and caused them to be sown . . . and brother John Burton destroyed the saffron which is in great abundance in St. Ives, and there did he sow woad, . . . whereby they are both defamed in those parts of bargaining and private gain, for they that sow such woad say that from a single acre they can get five, ten or twenty pounds, and yet they are in debt.' Cf. Lincoln, *Visitations of Religious Houses*, ed. by A. H. Thompson, 1927, iii (ii), pp. 303, 310.

or woadmen ever discontinued the practice after once embarking on it.[1]

(*b*) *Lincolnshire*

Lincolnshire, however, and some parts of Cambridge-

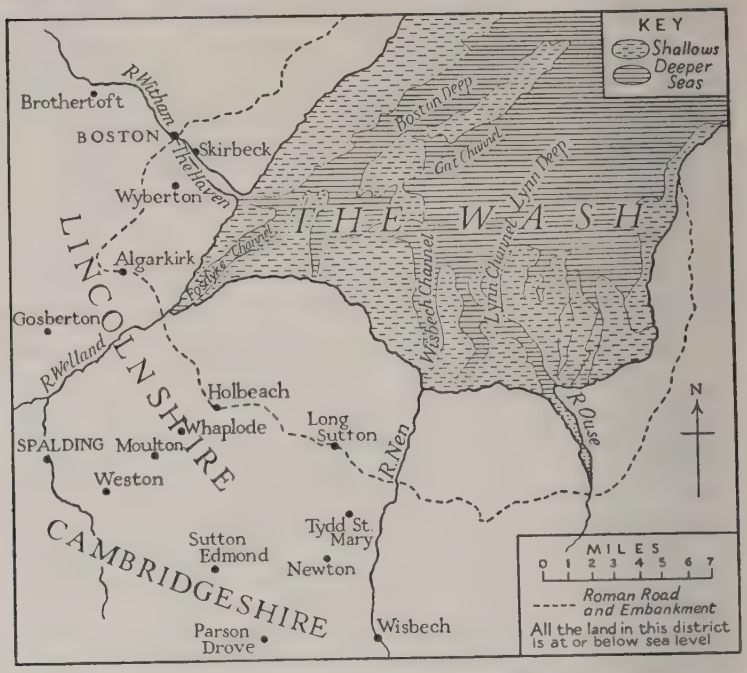


FIG. 5. Lincolnshire and Cambridgeshire Woad District

shire developed into the most important centre for woad, which flourished in the fenland (Fig. 5).

[1] Billingsley, 'Agriculture in the County of Somerset, 1798', *Nature*, lv (1896–7), p. 79.

Every woad district, both at home and abroad, was more or less closely associated with one or more cloth-manufacturing districts to which the woad it produced was supplied. Lipson in his map of the distribution of the woollen and worsted industries in England indicates the remarkable aggregation of the cloth centres in the woad district of Somerset. (E. Lipson, *The History of the Woollen and Worsted Industries*, 1921, p. 221.)

Spalding and Boston [1] were the principal woad towns of Lincolnshire (Fig. 5). Within easy reach of Spalding were Weston, Moulton, Whaplode, Holbeach, and Gosberton. Boston not only cultivated woad itself, but had in its neighbourhood Algarkirk, Skirbeck, Wyberton, Brothertoft, and Mount Pleasant.

Wisbech was the chief woad town in Cambridgeshire, and near this were situated Parson Drove,[2] Sutton St. Edmund, Newton,[3] Tydd St. Mary, and Long Sutton. These towns and villages formed an important woad area, in which the rich soil was specially adapted to the intensive cultivation of the plant.

At Wisbech the woad industry appears to have been restricted to certain families who had traditional chants of their own, which they sang during the plucking of the woad leaves. The first verse of one of these chants ran as follows:

> Molly, of the woad, and I fell out,
> O, what do you think it was all about?
> For she had money and I had none,
> And that is how the strife begun (*sic*).[4]

There were also woad farms in Hampshire in the 16th century, in Bedfordshire, and at Lathbury Bridge, near the confluence of the river Lovat, or Ouzel, with the Ouse, at Newport Pagnell in Bucks.[5]

[1] At Boston the cottages of the woad-growers were called 'Wad houses'. (*Notes and Queries*, 1929, p. 67.)

[2] At Parson Drove the last surviving woad mill was pulled down in 1914 during the Great War.

[3] At Newton there was formerly an inn named 'The Woadman's Arms'.

[4] *Aunt Judy's Annual*, 1883. A famous early thoroughbred mare 'Molly of the Wad' was named after this song.

[5] *Nature*, lv (1896–7), p. 155.

Blith, writing in the 17th century, thus referred to some other woad-growing districts in this country:

'Your best and naturallest parts of England for woad are some parts of Worcestershire and Warwickshire Southward, Oxfordshire, Gloucestershire, Northamptonshire, Leicestershire, some parts of Rutland, Bedfordshire, Buckinghamshire, and some other places here and there.' [1]

It would be interesting if the total production of woad in this country at different periods could be discovered. Few figures unhappily appear available. We may, however, arrive at a rough estimate of the production of woad towards the close of the 18th century, based on some statistics quoted in connexion with Mr. J. Cartwright's woad farm.[2] This farm was estimated to crop 200 acres every year, and as each acre yielded *c.* 1½–2 tons of woad, a moderate rate of production would supply an annual yield of *c.* 350 tons. If we assume that the three other important farms each produced the same quantity we obtain 1,050 tons, which, added to the 350, yields a total of 1,400 tons. The remaining woad-farmers are credited with a further supply of 50 tons, making a grand total of 1,450 tons per annum.

The price of woad fluctuated with the season and also with the quantity of the dye extracted from the leaves. The best woad was sold at from £25 to £30

[1] W. Blith, *The English Improver Improved*, 3rd ed., 1653, p. 227. J. C. Morton, *Cyclopaedia of Agriculture*, 1851, ii, p. 1159, states that woad was also grown in a few parts of Ireland as well as in Yorkshire.

In the 16th century there was living at Colchester a wealthy clothier and woad-grower named John Maynard who bequeathed to his wife his 'woade howse', &c. There was also a field-name 'Little Woadley' in Alphamstone, which seems to commemorate the former cultivation of woad. (*Essex Naturalist*, xvii (1912–13), p. 144.)

[2] A. Young, *General View of the Agriculture of the County of Lincoln*, 1799, pp. 154, 156.

a ton, while the inferior quality only fetched from £6 to £7.

If we assume the average price to be *c.* £20, the total value of the crop of 1,450 tons would amount to £29,000. Moreover, this calculation relates to a period when the cultivation of woad was already a declining industry owing to the competition of the foreign indigo.

D. THE HANSE OF LONDON

At this point it will be of interest to describe the important conventions referring to woad which were made with the merchants of Picardy. In the time of Henry III the trade in woad was closely connected with one of the principal associations of the Middle Ages, viz. the Hanse of London, which resulted from the settlement in London of a large number of foreign merchants, who came especially from Germany, Italy, the Low Countries, Gascony, Provence, and Brittany.[1] These foreign traders in the early 13th century formed a merchant guild known as the London Hanse for mutual assistance and support, and this merchant guild at one time included as many as seventeen towns on the Continent. Every important town in Flanders adhered to it, as well as Rheims, Amiens, Châlons, Corbie, and Nesle in France.[2] So powerful did this league grow that the English king frequently granted licences to trade either to towns or groups of towns belonging to it, instead of, as previously, to individual merchants.

Until the time of Henry III no alien woad merchants

[1] G. Schanz, *Englische Handelspolitik*, 1881, i, p. 386.

[2] The Hanse of London must not be confused with the Teutonic Hanse or Hanseatic League, by which it was eventually superseded. Cf. W. J. Ashley, *English Economic History and Theory*, 1894, i, pp. 106, 109.

were allowed to land or store their commodity in the City of London; any supplies of imported woad had to be sold on board the ship that had imported it. This regulation was evidently felt to be a serious grievance by the merchants of Amiens, Corbie, and Nesle, three important members of the London Hanse.[1]

In 1237, however, they were fortunate enough on certain conditions to secure from the City of London a Convention relaxing the onerous regulations that had hitherto been in force.

This Convention [2] granted those alien merchants certain valuable privileges, which indicate the hardships and inconveniences to which their less fortunate competitors such as Spanish or Italian merchants had to submit. These Picardy merchants were thenceforth to be at liberty to load and unload, and to warehouse within the City of London their cargoes of woad, garlic, and onions,[3] and to sell them within the City alike to citizens and to strangers of the realm. They were further allowed to carry them out of the City, by land or by water, to such parts of the country as they chose.

In return for these concessions, the foreign merchants agreed to pay to the Sheriffs of London fifty marks

[1] Picardy cultivated large quantities of woad which were exported to England. (Cf. Ch. vii.) Doubtless the prohibition to store woad in London prevented the French merchants from realizing as high a price for their wares as they would have done in the open market.

[2] This Convention is given *in extenso* in the *Liber Albus*, ed. by H. T. Riley, 1859, pp. 228, 418; 1862, pp. 62, 164; *Liber Custumarum*, do., 1860, ii (i), p. 64.

[3] These three items frequently appear amongst the list of goods imported by aliens. It seems as if the home supply for many years was inadequate to supply the demand. (Gras, pp. 360, 436, 606.) The Normandy woad merchants were granted similar permission to warehouse their woad in the year 1263. (J. Stow, *Survey of London*, ed. by C. L. Kingsford, 1908, i, p. 82.)

sterling a year at the times of the great fairs, viz. those of St. Ives (in Huntingdonshire), of Winchester, and of St. Botolph's Town or Boston, in Lincolnshire. At a later period this sum was commuted to one halfpenny for each quarter of woad imported.[1]

By way of confirmation of this compact, the merchants paid a sum of £100 towards the cost of the Conduit, which was being constructed for bringing water into the City from Tyburn spring.

Some other ordinances[2] for the regulation of foreign woad merchants are extant, which Riley suggests must be dated prior to the great Convention of 1237, since they are drawn up in a spirit quite incompatible with the provisions of that document.

These ordinances enjoin that all foreign merchants or *foranei*, when they have once come within the limits of the City known as *La Newe Were*, 'may not and ought not, according to the ancient customs and franchises of the City and the realm, to come to, or anchor at, any other place than London only'. On their arrival there, the merchants are reminded that it is their duty to place their woad upon the quay, and that they may enclose it with hurdles and hatches, if they think proper, but upon no account are they to stow it in houses or in cellars. Here they were to sell it, or give it in exchange for other merchandise, 'but only to men of the City, and to no one else, and that, by reasonable and ancient measure of the

[1] The Picardy merchants from Amiens, Corbie, and Nesle during only a portion of the year 1268 paid in woad dues to the 'custodes' of the City of London the sum of £11 6*s*. 8*d*. (D. Macpherson, 1805, i, p. 418; Madox, *Hist. of the Exchequer*, c. 18, § 4.) The merchants of Amiens actually appointed a proctor in London with full powers of attorney to look after their interests. (*Liber Albus*, ed. by H. T. Riley, 1859, pp. 424 f.; 1862, pp. 171 f.)

[2] *Liber Custumarum*, ed. by H. T. Riley, 1860, ii (i), pp. xlii, 68–9.

City'. Nor ought they to, nor might they, buy anything of foreigners, but only of men of the City, for exportation beyond sea, nor might they leave the City for the purpose of visiting any fair, or for going to any other place for the purposes of traffic. If found to be on the road to such a place, and proceeding towards a fair, all their chattels were to be forfeited, 'seeing that all their buying and selling ought to take place within the City, and that only with the men of the City'.

The foreign woad merchant was also to take care that the whole of his wares had been disposed of within such forty days, 'seeing that, when such term shall have expired, and it shall be his duty to depart, he may not hand over any part of his wares to his host, or to any other person, nor may he carry them away with him. But let him see that within the time limited he makes sale of the same, as well as he can, for if any part thereof shall be found after the time limited unto him, it shall be wholly lost.'

Such oppressive regulations seem at first to indicate that the civic authorities had conceived an inveterate hatred against all foreign woad merchants, and wished to prevent any importation of the dye. As a matter of fact, however, the regulations reflected the spirit of mediaevalism which sought to favour home production and to embarrass foreign trade.[1]

[1] Although woad was not one of the five chief staple commodities of England, which comprised wool, woolfels, leather, tin, and lead, it formed one of the lesser staple commodities or 'gross wares', as they were afterwards called. We read that the merchants of Amiens, Corbie, and Nesle in 1334 'stapled' their woad, onions, and garlic in London. Again, in the 22nd year of the reign of Henry VIII the English merchants established a staple for their woad in London. Woad staples were more important on the Continent than in England. (G. Schanz, *Englische Handelspolitik*, 1881, i, pp. 129, 292.)

A few years later, owing to disputes over the subject of dock charges in London, foreign woad merchants left London and migrated to Norwich, where an important Agreement, dated 1286 and still extant, was drawn up between the citizens of Norwich and the woad merchants of Amiens and Corbie.[1] This Agreement gives so many interesting details about the trade in woad that it has been given *in extenso* (cf. Appendix III). The woad merchants returned to London in 1334.

E. 'THE WOAD MERCHANTS OF CANDELWYKSTRETE'

The location of the woad market in London is uncertain, but was probably in a street formerly known as Candelwykstrete, a name which was afterwards corrupted to Canwick Street, and ultimately to Cannon Street.

Previous to 1237 the foreign woad merchants who imported large quantities of their commodity from Picardy were not allowed to warehouse their woad anywhere in the City, but had to sell it either on board their ships or on the wharf, a serious detriment to their prospects of selling their wares. After 1237, however, these merchants were granted greater freedom, as has been described elsewhere, and settled in Candelwyk Street, which seems to have become the rendezvous of woad merchants. We read that in 1303 before 'the woad merchants of Candelwykstrete' and before 'Gilbert de Veer, John Fowace and James Dek, merchants of woad from parts beyond the sea, . . . Wybert de Abbeville was sworn a broker of woad to testify justice and truth and

[1] At the close of the 13th century there were at Norwich no less than five merchants described as 'le weyder', i. e. engaged in the woad trade. Cf. *Transactions of the Norfolk and Norwich Naturalists' Society*, v (1889–90), p. 155.

nothing else, as well for buyer as seller, etc.' [1] Candelwykstrete was also the centre of the cloth trade, the clothiers being doubtless the chief customers of the woad merchants. Stow writes that 'The Drapers of Lombardstrete and of Cornehill are seated in Candelwickstrete and Watheling streete', and that 'in Candlewright Street Drapers profered him cheape cloath'.[2]

Before Edward III's reign this street was occupied by cloth workers, especially by burellers or makers of the coarse stuff called 'burel'. These burellers had a quarrel with the weavers—'in 1335 the burellers of Candelwyk Street were in controversy with the weavers'.[3] At a still later date the street seems to have been inhabited by weavers of woollen clothes, 'weavers of diverse sorts, to wit of Draperie and Naperie', brought in by Edward III. . . . 'These Weavers of Candelwright street being in short time worne out, their place is now possessed by rich Drapers, sellers of woollen cloth etc.'

Again, the Steelyard, by which foreign goods imported into London were weighed, was also situated on the site now occupied by Cannon Street station. For over 400 years it belonged to the Hanseatic League, a community of foreigners who imported woad and many other wares into England.

Further, the hall of the Dyers' Company originally stood at the south end of what is now Dyers' Hall Wharf, Upper Thames Street, which is not far from Candelwyk Street,[4] while the wool market was near Cornhill, only

[1] Calendar of Letter Books of the City of London, Letter Book C, 1901, pp. 135 f.
[2] J. Stow, *Survey of London*, ed. by C. L. Kingsford, 1908, i, pp. 81, 217.
[3] Ibid., l.c., i, p. 218; cf. also Letter Book E, pp. 172, 291.
[4] W. Besant, *London: The City*, 1910, p. 240.

a short distance off. Thus it appears that the trade in woad and cloth as well as the craft of weaving were concentrated in the neighbourhood of Candlewright street,[1] every facility being afforded for an active trade in the twin commodities of wool and woad.

F. WOAD REGULATIONS

Although some regulations under which the woad trade was carried on in England have already been described, it will be convenient to give some additional examples under a special heading. Happily English woad merchants were never hampered by such irksome restrictions as were imposed on similar traders in other countries such as France and Germany. Speaking generally, however, there was much resemblance between the conditions of trade in England, France, Italy, and Germany, the main difference being that in England the State interfered but little, while in France it controlled even minute details, and in Italy and Germany the system of control by guilds was widely adopted. In the following pages we shall deal mainly with London, the chief woad emporium, although most of the regulations applied to other large towns, such as Bristol and Southampton. In London the woad trade was largely controlled by the mayor and aldermen, who when granting privileges to woad merchants used the common seal of the City; and they also appointed the officials connected with the woad trade.[2]

Many officials were associated with the woad trade,

[1] Not far from Cannon Street is West Chepe or Cheapside, the Wodestrete (Woudestrete) which H. T. Riley suggests may refer either to wood or to woad. (*Liber Albus*, 1860, ii (ii), p. 776.)

[2] On the other hand the Sheriffs received the custom due on woad. (*Liber Albus*, 1862, p. 61.)

including brokers, measurers, assayers, and porters.[1] The woad brokers formed an important body of officials who were sworn and admitted to office by the mayor and aldermen. The following is the oath of the Brokers:

'You shall swear, that you shall not deal, by yourself or by any other, in any merchandize whereof you shall make brokerage; nor shall you make any bargain if you do not bring the seller and buyer together, and lawfully witness the bargain between them; and no bargain shall you make between alien and alien of any wares. And all the bargains which you shall have to make, you shall effect them as well for the poor as for the rich; and you shall take for no brokerage more than at the Guildhall is and shall be ordained. And you shall make no bargain or usury, under pain of paying one hundred pounds unto the Chamber, as also of incurring the penalty for usury for Brokers heretofore ordained. And if you shall know of any man meddling with any brokerage within the franchise of the said city, who has not been admitted by the Mayor and Aldermen, and sworn unto the said city, you shall make such known unto the Mayor and Chamberlain of the said city for the time being.—So God you help, and the Saints.'[2]

If any such broker was found guilty of forestalling any kind of merchandise coming towards the City he was liable to forty days' imprisonment. For a second offence he was again imprisoned for forty days, and might never again hold office as a broker within the City.[3]

These brokers were forbidden to do any business on their own account, and must confine themselves to the duties of brokers. Further, no woad broker might be the host of any woad merchant. Nor might a man be admitted to the office of broker except upon 'the present-

[1] *Liber Albus*, 1860, ii (i), p. 134; do., ii (ii), p. 776.
[2] Ibid., ed. by H. T. Riley, 1862, pp. 127, 167.
[3] Ibid., p. 87.

ment of the good folks of the trade in which he was about to be broker'.

Some brokers were evidently allocated to certain districts of London. Thus in 1311 Fulbert Pedefer de Wytsand was elected by good men of the City, merchants of woad and by merchants of Corbie and Neel, to be a broker of woad, and was presented and sworn before the Mayor to faithfully execute the office between buyer and seller to the west of London Bridge and not elsewhere.[1]

The brokers were controlled by certain ordinances which fixed the scale of brokerage allowed, which was as follows:

woode [i. e. woad] by the ton iis.
woode [i. e. woad] by the bale iiiid.[2]

The brokers mainly acted as go-betweens for foreign importers and city merchants.

A second body of officials were known as meters or measurers, who were 'sworn to faithfully measure woad as well for buyers as for sellers'. In early times these meters were humble folk, but as London grew their places became valuable and sought after. In the year 1349 we read that William de Hoo was elected measurer of woad by merchants of Amyas, Neel, and Corbie, and John Longe, measurer of woad, by Dyers of the City.[3]

Woad was not weighed by the tron or King's great beam, which was used for weighing heavy commodities such as wool, alum, and wax, but by the small beam or balance (Statera parva) which was used for merceries and goods weighed by the pound (avoirdupois) weight.

[1] Calendar of Letter Books of the City of London, 1902, D, p. 258.
[2] R. Arnold, *Customs of London*, 1811, p. 74.
[3] Calendar of Letter Books of the City of London, 1904, F, p. 192.

Such goods would include pepper, ginger, brazil wood, &c.[1] If we may judge from other towns there were also official porters whose duty it was to transport bales of woad from place to place.

Other officials were known as assayors, whose business was to assay woad that was offered for sale by woad farmers and then to assign to it its proper price according to the results of their tests. Disputes sometimes arose as to the value of woad fixed by the assayor.[2]

Few details in regard to the assaying of woad in London appear to be extant. At Winchester, however, we have the following entry:

'It is the usage of the dyers' mistery in the city that two trustworthy and lawful men be elected by common assent and sworn to assay the woad of foreign merchants that come into the city for sale and lawfully execute the assize to buyer and seller.'[3]

And again:

'In relation to the dyers' craft we hear of tolls levied on the three chief agents at that time in use, madder (*warende*), orchil or lichen (korc) and woad (weide), as well as on potash *cendre* employed in the same industry. Two prudeshommes or assayors of woad were elected by the common assent of the mystery of dyers and sworn to test the woad brought by strange merchants for sale and enforce the assize.'[4]

Probably a similar custom was in force in London, the assayor being controlled by the dyers' guild.

Other regulations applied to dyers. For example, long cloth, i. e. cloth of the highest quality and price, might only be dyed black or rather dark blue with woad,

[1] *Liber Albus*, ed. by H. T. Riley, 1859, p. 226, 586; 1862, pp. 61, 62, 73, 74. *Liber Custumarum*, ed. by Riley, 1860, pp. 784, 828, 832.
[2] Calendar of Letter Books of the City of London, 1899, A, p. 230.
[3] J. S. Furley, *Ancient Usages in the City of Winchester*, 1927, pp. 40–1.
[4] *Victoria County History of Hampshire*, v, p. 480.

since that dye was found to be more permanent than other dyes such as madder that were sometimes used for the purpose. Again, no dyer who dyed wool with woad was allowed to dye hats or caps, the cappers' craft being regarded as a separate trade for which inferior dyes were deemed adequate.[1]

Dyers were also closely associated with the testing of woad and with the levying of the assize or tax on woad.

The prices to be charged for dyeing woollen goods were strictly regulated by the Dyers' Company, who endeavoured to enforce the price agreed upon. This, however, was not always found possible, as rival dyers declined to be bound by the Company's regulations and became what in modern parlance are called blacklegs.

For example, towards the end of the 15th century there was a quarrel between the Guild of Dyers and a firm of non-gildani. Thomas de Fenby and ten other dyers of Coventry complained against John Egynton and William Warde that they had assembled the members of their trade and had compelled them to swear to various things contrary to the law and their conscience; further, no one was to buy any woad until it had been viewed and appraised by six men chosen for the purpose by the said Egynton and Warde, nor might any dyer make any scarlet dye at less than 6*s*. (the vat?), or put any cloth into woad for less than 4*d*. or 5*d*. Warde and Egynton also adopted the mediaeval

[1] In the early days both cloth merchants and dyers appear to have practised the art of dyeing, although each craft was strictly limited in its sphere of operations. Cloth merchants could use any pigment except woad, while dyers might either dye in woad or sell either woad-dyed or white cloth. 'Non licet tinctoribus pannos suos proprios tingere nisi tantum in waido, vel illos vendere nisi waido tinctos vel albos.'—*Placitorum Abbreciatio* (ed. 1811, 65).

form of picketing by actually hiring Welshmen and Irishmen to waylay and kill the complainants on their way to the neighbouring markets.[1]

An interesting question arises as to the charges made by dyers for dyeing with woad. In Coventry the usual price for many years for dyeing cloth was 5*s*., 20*s*. being charged for dyeing 60 lb. of wool, and 4*s*. for dyeing 12 lb. of thread. These prices, however, were by no means fixed, for in 1415 they were raised by a third, much to the annoyance of the public. In London the price for dyeing was much cheaper.[2]

Further, the dyers were accused of taking the best part of the woad and madder for their own cloths and using only the weaker portion for the cloths of their customers. A petition was therefore made that two drapers, a woader and a dyer, should be elected annually to supervise the dyeing trade.[3]

In some provincial towns there were special regulations for the woad industry. For instance, at Bristol both Picardy and Toulouse woad were imported in the form of dry unfermented balls, i.e. the so-called green woad. These balls had to be broken up, sprinkled with water, and were then allowed to ferment; not till this had been done could the woad be used in the vat. Even the Bristol woad porters were put on their oath that they would faithfully perform their duties, which included giving assistance in connexion with the fermentation of the woad. These licensed porters were allowed 4*d*. per ton for preparing Picardy woad for fermentation and

[1] Early Chanc. Proc., 7, no. 23; L. F. Salzmann, *English Industries of the Middle Ages*, 1913, p. 147.

[2] *Liber Albus*, ed. by H. T. Riley, 1862, p. 278.

[3] *Rot. Parl.* iv. 75; L. F. Salzmann, *English Industries of the Middle Ages*, 1913, p. 146.

8*d.* a ton in the case of the harder Toulouse woad. Further particulars will be found in Appendix IV.

Owing to the high cost of woad, dyers were tempted to substitute a cheaper dye such as madder or else to use a mixture of the two dyes. Serious penalties were inflicted on persons who infringed the regulations. Various instances of this are recorded in the history of Leicester.[1]

At Southampton other regulations were in force which are of interest as illustrating the civic economics of the Middle Ages. Brokers in this town appear to have dealt with all kinds of commodities, not being restricted to a single merchandise like woad, as was the case in London and at Bristol. This is all the more surprising as woad formed one of the most extensive articles of import, especially in the early reign of Henry III.[2]

In order to realize the outstanding importance of woad, it must be borne in mind that during the Middle Ages the usual colours of clothes[3] were blue and black, these being just the colours for which woad was indispensable.[4] Further, cloth and woad were not, like

[1] M. Bateson, *Records of the Borough of Leicester*, 1899–1905, i, pp. 84, 102, 202.

[2] P. Studer, *The Oak Book of Southampton*, 1910, i, p. 157; ii, pp. xx, 11, and *passim*.

[3] A green dye could also be obtained from woad, although it was much less used than blue and black. For the production of the latter madder and logwood were frequently mixed with woad.

[4] The cloth manufactured in England was not necessarily dyed in this country. Thus in the time of Henry VIII, although there was an enormous export of woollen cloths, the great bulk of them, more than 95 per cent., were dyed abroad. Cf. Schanz, *Handelspolitik*, 1881, ii, p. 17; W. J. Ashley, *Economic History and Theory*, 1893, ii, p. 225.

An interesting letter addressed to Edzart and John, Earls of East Friezeland (British Museum, Sloane DCCC xviii. f. 21) has survived, describing the profits made by poor labourers and artisans such as the dyer, the clothworker, the seller of madder, alum and woad, &c., out

bread, limited to a local market, but had a much wider area to cater for. Both these commodities could be kept until the market was favourable, and this feature had an important bearing on the economics of woad.

Some special regulations were applicable to foreign woad merchants who imported large quantities of woad into London, some from Picardy, some from Toulouse, and some from North Germany.[1] Many details will be found under 'The Hanse of London'. On various occasions Parliament made regulations as regards dyeing with woad.

For example, in 36 Edw. III (1362) dyers who dyed wools with woad were forbidden to dye hats, caps, linen thread, or silk, on pain of paying 100*s*. to the Chamber, every time he shall be convicted thereof.[2] The probable reason for this was that the cappers' trade was a distinct one and involved the use of dyes less expensive than woad. Cappers wished to avoid the competition of woad dyers. Elizabeth insisted that her subjects should wear English caps. (Cf. W. Cunningham, *Growth of English Industry and Commerce*, i, p. 397; ii, p. 25.)

In 24 Hen. VIII, c. 2, other regulations were issued in regard to the dyeing of cloth. The wardens of the mystery of dyers in every corporate town might search

of the woad trade. This was quite apart from the great profits made by the cloth merchants who carried cloths to the marts of Frankfort, Leipzig, and Noremborow (Nuremburg) in Germany. . . . 'Here your grace may see the subjectes of K. Phillip doe gain yerly by woll and wollen cloth that cometh out of England almost 600,000 li which is 240,000 dollers.'—W. Cunningham, *Growth of English Industry and Commerce*, 1903, ii, p. 224.

[1] G. Schanz, *Englische Handelspolitik*, 1881, i, p. 451, speaks of 'all London full of foreign woad'.

[2] H. T. Riley, *Memorials of London and London Life*, 1868, p. 309; Letter Book G, fol. ci.

the dyehouses within a mile compass of each town, and in places where no wardens existed the local officers were to do it instead. This was doubtless to ensure that all the regulations were observed.[1]

In the 17th century the use of logwood was introduced in the place of woad as a cheaper source of black. The result, however, was unsatisfactory, as logwood was a less permanent dye, and in order to check its use Parliament in 1726–7 (13 Geo. I, c. 24) gave the Dyers' Company the right of search within a considerable area round the metropolis.[2]

Even as recently as the close of the 18th century we find the legislature regulating the use of woad, indigo, madder, and logwood and enforcing penalties. Thus in 1782–3 (23 Geo. III, c. 2) an Act was passed for preventing Frauds and Abuses in the Dyeing Trade. The following are some of the most important clauses:[3]

2. AND . . . if any person or persons whomsoever shall after the passing of this Act, within that part of Great Britain called England, Wales and Berwick upon Tweed, dye or cause to be dyed any cloths, bays or other woollen goods of any kind or sort whatsoever, as or for mather blacks, the same not being dyed throughout in the first place with woad and indigo, every such person shall forfeit and pay the respective penalties following,

For every piece of long Bocking bays containing seventy yards or upwards the sum of five pounds:

For every piece of Colchester bays or short bays, containing thirty-five yards or upwards, the sum of fifty shillings:

[1] W. Cunningham, *Growth of English Industry and Commerce*, 1890, i, p. 458. [2] Ibid., l.c., 1903, ii, p. 321.
[3] *The Statutes Revised*, 1889, ii, pp. 548 f.

And for every piece of other woollen goods of any kind or sort whatsoever, the sum of sixpence per yard.

And if any person or persons whomsoever shall after the passing of this Act, within that part of Great Britain aforesaid, dye or cause to be dyed any woollen cloth as or for woaded black, the same not being woaded throughout, every such person shall for every such offence forfeit and pay for every piece of such cloth the sum of two shillings per yard.

3. AND . . . all cloths, bays and other woollen goods which shall be truly mathered black according to the directions of this Act shall be marked with a red rose and a blue rose, and all woollen cloth which shall be truly woaded black throughout according to the directions of this Act shall be marked with a blue rose only; and if any person or persons whomsoever shall counterfeit or forge or cause to be counterfeited or forged any of the said marks, or shall dye, stain, imprint or affix any such mark to or upon any such woollen cloths falsely and deceitfully dyed as or for mathered or woaded blacks as aforesaid, every person so offending shall for every such offence forfeit and pay the sum of four pounds for every piece of such woollen goods to or upon which such mark shall be so stained, imprinted or affixed as aforesaid.

4. AND . . . if any person or persons whomsoever shall after the passing of this Act, within that part of Great Britain aforesaid, use or cause to be used any logwood or logwood liquor in dying blue any cloths, bays or other woollen goods of any kind or sort whatsoever, every such person shall for every such offence forfeit and pay the sum of twenty pounds for every piece of such cloth, bays or other woollen goods in the

dying of which any logwood or logwood liquor shall have been made use of as aforesaid.

5. AND for the better preventing frauds and abuses in the dying of cloths, bays and other woollen goods, be it enacted, that the master, wardens and court of assistants of the Company of Dyers of London, under the common seal of the said company, . . . shall and are hereby impowered and required to appoint such number of persons as they shall think proper to be searchers of all shops, warehouses, workhouses and tenter-grounds or drying-places of all and every person and persons, companies and corporations, using or exercising the trade, art or mystery of dying of cloths, bays, or other woollen goods of every kind or sort whatsoever, and also of all and every person and persons concerned in the dying, drying or packing of any such cloths, bays or other woollen goods, and also all publick warehouses and other publick places where any cloths, bays or other woollen goods packed up for exportation shall be deposited, situate within the city of London, and within the distance of ten miles from the said city, and from time to time appoint others in the room of such as shall die, resign or be removed.

7. AND . . . the said company of dyers and the persons herein-before authorised to act in the appointment of searchers, or any three or more such persons, shall hold their first meeting for the appointment of searchers as aforesaid at Dyers Hall in the city of London, upon the seventh day next after the passing of this Act.

This Act of Parliament is interesting from various points of view. It reflects a period in our history when minute details in industry were regulated by the State.

Further, the master and other officers of the Dyers' Company were entrusted with authority to regulate the dyeing industry. It also refers to the use of blue and red roses to indicate the dyes which had been used for various cloths, a practice which was largely adopted in France. Lastly, the Act relates to a time when both woad and indigo were still in use.

G. THE NAVIGATION ACTS

The Navigation Laws passed during the Tudor period exerted a considerable influence on the woad industry.[1]

Until the time of Henry VII the policy of England had been to encourage foreign merchants 'to bring in all sorts of commodities, having for end cheapness, and not looking to the point of state concerning the naval power'.[2] In fact the major part of the foreign trade of England was carried on by foreign merchants owning foreign ships. Not till the parliament of 1489 (4 Hen. VII, c. 10) were the danger of this situation and the resulting national weakness fully realized, although the subject had from time to time been discussed by the legislature. French wine and woad took a prominent place in the question.

The dangerous position as placed before parliament was that 'great minishing and decay hath been nowe of late tyme of the navye of this realme of Englande, and ydelnes of the maryners of the same, by the whiche this noble realme within shorte process of tyme, without

[1] The earliest Navigation Act for the 'increase of the navy of England which is now greatly diminished' was passed in 1381 (5 Ric. II, i, c. 3). (W. Cunningham, *Growth of English Industry and Commerce*, 1890, i, p. 352.)

[2] W. Kennet, *A Complete History of England*, 1706, i, p. 597.

reformation be had therin, shall not be of abylytye ne of strengthe and power to defend itselfe'. Accordingly parliament enacted that 'no wines of Guienne or Gascoigne, nor woad of Tholouse,[1] should be imported into England, Ireland, Wales, Calais or Berwick, unless in vessels belonging to the king or some of his subjects of those territories, and navigated by seamen of whom the greater part should be natives of the same territories. They also prohibited the king's subjects from shipping goods in England or Wales on board any vessel owned by a foreigner, unless when sufficient freight could not be found in English vessels. Foreign vessels, loaded with wine or woad, if driven into English ports by storm or enemies, were allowed to sell as much as would pay for necessary provisions or repairs, and no more.'

In the time of Henry VIII another Navigation Act was passed in which woad is referred to:

23 Henry VIII. Navigation Act. C. 7

'An Acte that the Statutes made for the mayntenance of the Navie of this Realme shall stande in full strength; and howe Gascoyne and Frenche wynes shall be brought in, and the same and other wynes solde.

'Where for the mayntenance and good continuance of the Navie of this Realme of England it was ordeyned

[1] D. Macpherson, *Annals of Commerce*, 1805, i, p. 712. Woad and wine were frequently imported in the same ships and placed under the same regulations. As far back as 1189 those two commodities are mentioned in conjunction as imports, wine produced in the King's French dominions forming a very considerable part. (W. Malmesbury, *Gesta Pont.*, p. 133. Cf. also Macpherson, *Annals of Commerce*, 1805, i, pp. 346, 716.) A curious case is recorded by Macpherson in which in 1492 two French merchants were allowed to import their goods in spite of the Navigation Laws, except as regards wine from Gascony and woad. The prominence given to woad indicates its importance amongst the goods imported into the country.

and enacted by a statute made in the v. yere of the reygne of the ryght noble King Richard the Seconde, that none of the Kinge's liege people shuld shipp merchaundise in any other shipp than in an English shipp upon peyne of forfeiture of the said merchaundise so shipped: And after that, by another Statute made in the vj. yere of the said noble Kyng, it was enacted that for defaulte of Englisshe shippes every man myght shipp their merchaundise in Strangers' Shipps: And after that, at a Parliament holden at Westm., in the iiij. yere of the late noble Kinge of famous memorye Kinge Henrye the vij., it was ordeyned and enacted that no personne shuld carie or bringe any wynes of Gascoyne or Guyon, or Toloos Ode (Woad) into England, Wales, Ireland, Calece, or the marches thereof or Barwike, but onely in shippes of England, Wales, Ireland, Calece, or the marches thereof or Barwike; and that the Maister and Mariners of the same shippes for the moost part of them shuld be of the same countres; upon payne of forfaiture of the said Wyne and Ode as by the said good estatutes more at large is expressed: and notwithstanding the said good estatutes, yet nevertheless the Navye of this Realme and the multitude of the shippes of the same, which to-fore this time hath ben not onely a greate defence and suertie to this Realme of Englande in tyme of Warre, but also a high commoditie to all the Subjectes of the same for transporting and conveyance of merchauntdises in and frome this Realme, is nowe marvelously decaied and appaired, and by occasion therof a great multitude of the Kinge's liege people which were Masters and Mariners of shippes, and by the exercise therof they, theyr wifes, and children, had their livinges, be now mynysshed and impoverisshed; in suche wise

that within fewe yeres there shal be fewe Englisshe men that shalbe experte in the Sees, to the great perill of this Realme and decaye of the people of the same, if remedie be not provided in this behalve: In consideracion wherof, the Kinge's moost Roial Majestie of his moost excellent goodnes, having tender respecte to the reformacion of the premisses, is contented and pleased, that it be enacted by his Highnes and the Lordes spirituall and temporall, and the Commons in this present Parliament assembled, and by auctoritie of the same, that the said estatutes and everything in them conteyned shall stonde in their full strength, force, and effecte, so that frome hensforth no persone shall attempte to do contrarie to the tenours of any of the said estatutes, upon the peynes conteyned in the same.'[1]

During the reign of Henry VIII the export of wool declined, while the export of woollen cloths greatly increased.[2]

This increase must doubtless have implied an increased consumption of woad, although strange to say the dyed and half-dyed cloths only formed a very small proportion of the enormous amount exported. Apparently at this period the foreign dyers had recaptured a large part of the dyeing industry, or possibly the prosperous cloth trade gave enough dyeing to be done at home, even though many cloths were dyed abroad.

Henry VIII largely availed himself of the system of licences giving exemption from legal enactments. For example, licences were granted in return for payment to foreign traders to import woad and other commodities

[1] *Statutes at Large*, ii. This Act was repealed 1 Eliz., c. 13, but re-enforced 5 Eliz., c. 5, § 11. Cf. also 5 and 6 Edw. VI, c. 18.

[2] During the last 180 years the export of cloth had increased twenty-five-fold.

in other than English ships (cf. Ch. xi.). So frequently were the licences granted as to reduce the law almost to a dead letter.

The reign of Edward VI brought another change in the Navigation Acts referred to above. At this period the navy of England had again declined; accordingly it was decided to repeal the Acts forbidding the importation of wool and woad except in English ships (5 and 6 Edw. VI, c. 18). A further reason was the enormous price that these commodities had reached in England.[1]

The effect of the Navigation Acts was to interfere considerably with the trade-routes of woad as well as with the importation and price of the commodity. Thus the Acts made it impossible for the Venetians to continue to bring their woad and French wine to England.[2] This trade passed mainly to Bordeaux, where a woad staple was established. But it was not always easy even in that great port to obtain English ships with English sailors. The trade in Picardy woad was also greatly restricted. On the other hand the great rise in the price of woad stimulated its production at home.

H. 'THE OLD ORDER CHANGETH'

Only a few words need be added here as to the decline of the woad industry in England, as Ch. xviii will be devoted to this subject viewed from a European standpoint.

By the early 19th century the woad industry was rapidly declining even in Lincolnshire and Cambridge-

[1] The importance of woad in industry at this period is shown by the fact that when French imports, *c.* 1563, were classified into two sections of 'necessary' or 'superfluous', Toulouse woad was regarded as a 'necessary'. (H. Hall, *History of the Custom-Revenue*, 1885, p. 242.)

[2] G. Schanz, *Englische Handelspolitik*, 1881, i, p. 131.

shire, hitherto the chief centre of the woad cultivation in England, and to-day is wellnigh extinct. The reason for this is the introduction of indigo derived from the exotic Indigoferas, and since 1878 of artificial indigo produced in the chemist's laboratory.

There are, however, still two woad farmers who cultivate woad for the market. The plant, however, is no longer grown as a source of dye, but as a means of exciting active fermentation in the woad vat, as described in Ch. iv.

CHAPTER VII

THE WOAD INDUSTRY IN FRANCE

THE woad industry of France has played an important part in the economic life of the French nation and at one time was a source of great wealth. Almost all the woad required by the French dyeing industry was grown at home, but France also supplied a large proportion of the pigment required by English and Flemish dyers.[1] French woad was of high quality and in much demand.

It will be convenient to deal in order with:

A. WOAD DISTRICTS.
B. WOAD REGULATIONS.
C. THE EXPORTATION OF WOAD.
D. WOAD AND THE CONTINENTAL BLOCKADE.

A. WOAD DISTRICTS

The three chief areas of woad culture were the provinces of Languedoc in the south and those of the Somme and Lower Normandy in the north.

(*a*) *The Languedoc*

In the Languedoc, where woad was called guesde, guède, or pastel, there was an extensive and highly prosperous woad industry, and many of the stately houses that still adorn the city of Toulouse were built by wealthy woad merchants.[2]

[1] Further particulars will be found in the works by Astruc, Gilliodt van Severen, Michel, and Thierry mentioned in Appendix A.

[2] An interesting reference to woad occurs in the Land Regulations made by Charlemagne (*c.* 742–814), where 'flax, wool and woad' are

The woad balls were called in French *cocs*, *coques*, or *cocaignes*, and were chiefly manufactured in the Languedoc; for this reason the district was sometimes called the *pays de cocaigne*, a term which afterwards came to denote any land of unusual fertility and wealth. In a good year the profits derived from woad were as great or even greater than the value of the field in which the woad was growing.[1]

The cultivation of the woad plant and the preparation of the woad dye in the Languedoc differed in some details from the method adopted in England. According to Astruc two kinds of woad were cultivated. The kind with violet pods was preferred, because the corresponding plants bore smooth leaves, while the second kind, of which the pods were said to be yellow, bore hairy leaves which collected dust and mud and yielded a less valuable pigment.[2] This latter kind of woad was called 'Pastel Bour' or 'Bourdaigne'. The plant was sown in narrow beds about three feet wide separated by intervals, a plan which facilitated the subsequent process of weeding.

As a rule there were five pickings of leaves during the season. On the fifth occasion, however, the entire top of the plant was removed, including the upper portion of the root. The dye extracted from this portion was of

alluded to 'ad genicia nostra, sicut institutum est, opera ad tempus dare faciant id est linum, lanam, waisdo', &c. Charlemagne, *Capitulare de Villis*, c. 43 (ed. by J. P. Migne, *Patrologia Latina*, xcvii, p. 354). Another allusion occurs in the time of Louis the Pious (814–40), where we read that woad and madder were supplied by certain villages to the women who did the spinning and dyeing for the royal palace. (G. Hegi, *Flora von Mittel-Europa*, iv (i), p. 198.)

[1] G. de Catel, *Histoire de Languedoc*, 1633, i, p. 49.

[2] Astruc speaks of violet and yellow 'seeds', whereas 'pods' must be meant, as no species of woad produced violet seeds. He also appears to be in error as regards the colour of the pods, which depends on the state of maturity but not on the species.

inferior quality, and indeed was forbidden under the Regulations; the woad extracted from it was called *Pastel Maroquin.*

The mature leaves were reduced to pulp in woad mills (Pl. XIII *a*) in much the same way as was done in England. Sometimes these mills were driven by wind or water. The pulp was next thrown into a heap, either in one of the halls belonging to the mill or out of doors, if the weather was fine. It was then well kneaded and trodden with hands and feet and beaten into a solid mass with a shovel. In this state the woad was called 'Pastel en Pile'. In the course of a few days a crust formed which gradually assumed a blackish colour. Any cracks in the crust were very carefully closed up, otherwise the whole mass was apt to split. About a fortnight later the mass of pulp was opened up and again kneaded, till the crust and the interior portions were thoroughly mixed. It was sometimes necessary to break up the crust with a hammer so as to enable the mixing process to be effected satisfactorily.

Small loaf-shaped balls each weighing about 5 lb. were now manufactured out of this paste.[1] These balls were well squeezed while being kneaded by the first workman so as to get rid of any liquid, and were then passed on to a second workman who pressed them into a wooden mould such as is shown in Pl. XIII *a*. This mould converted the ball into a more or less

[1] The weight of the balls evidently varied greatly. Barral and Sagnier state that a hectare of land, if cropped five times, would yield 15–20,000 kg. of fresh leaves. From these leaves *c.* 20,000 balls could be manufactured, weighing in all 1,200 kg. These balls were sold at the rate of $2\frac{1}{2}$ francs the hundred, and 1,200 kg. of balls supplied 36–44 kg. of indigo. (*Dictionnaire d'Agriculture*, 1900, iv, p. 52). The hectare was equal to *c.* $2\frac{1}{2}$ acres.

elongated mass, each end in turn being forced into this mould. The ball was next given to a third workman who pressed it into a somewhat smaller mould so as to give the whole lump its proper shape. At this stage woad was called *Pastel en Cocaigne*.

The final stage consisted in the conversion of these balls into the fermented woad ready for the dye vat. At least 100,000 balls were usually dealt with at one operation which consisted in the reduction of the balls to powder with a wooden mallet, and the subjection of the mass to fermentation much as was done in England. The woad was eventually reduced to a powder (*Pastel en Poudre*), in which form it could be used by the dyer.

Astruc states that this woad so prepared gave a 'beautiful and permanent blue dye'.[1] It was also used for dyeing in various other colours. Thus black, scarlet, and green fabrics were passed through the woad vat in order to 'fix' the colour. Indeed woad was used in France for so many other colours that dyers worked according to a definite scale which indicated the strength of the woad solution required for each colour or shade.

In the early 18th century many woad mills were still in existence in the country districts of the Languedoc. Nowadays they have all disappeared, and even in the local museums it is difficult to discover any exhibits recalling this famous and lucrative industry. The importance of woad in the economic history of Languedoc is shown by the fact that every year Toulouse sent to Bordeaux no less than 100,000 bales of woad. As each

[1] F. Michel (*Histoire du Commerce etc. à Bordeaux*, 1867, i, p. 295) says that woad 'fait la meilleure couleur du monde'.

bale was worth at least £15, the entire consignment must have been worth £1,500,000. That sum must be multiplied several times over, if it is to represent money at its present value. No wonder that the Languedoc regarded its woad fields as a gold-mine.

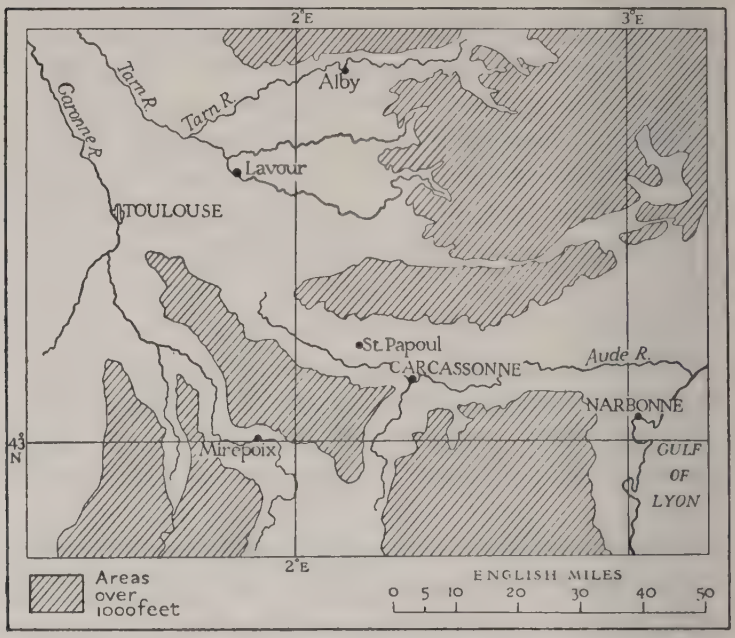


FIG. 6. Toulouse Woad District

Much of the woad produced in the south of France was cultivated at Toulouse, while various adjacent towns, including Saint-Papoul, Mirepoix, Lavour, and Alby,[1] contributed a share (Fig. 6). Woad of high

[1] In the neighbourhood of Alby another method of preparing woad was introduced about the middle of the 19th century. The leaves, when gathered, were exposed to the sun on large frames and thoroughly dried. They were then wrapped up and kept in dry and well-aired sheds, the fermentation process being carried out subsequently by

quality, known as Auragois woad, was also grown near the Aurige river which runs into the Garonne near Toulouse. These centres supply a good illustration of the localization of an industry which doubtless contributed to the high quality of the Toulouse woad. The produce of this woad district was used by the cloth manufacturers of Narbonne, Carcassonne, and neighbouring towns, and sent to distant parts of France. Much was exported to foreign countries, especially *via* Bordeaux, which became a great woad emporium.[1]

(*b*) *The Somme*

The Somme, the second important woad district in France, also produced large supplies of the dye, which was called 'la waide', balls of woad being known as 'tourtels de waide'. There were various towns as well as many villages in which woad was cultivated, much of the produce being shipped across the Channel. In the department of the Somme may be mentioned Amiens, Aveluy, Bertangles, Camoy, Conty, Chaulnes, Corbie, Doingt, Dommetiers, Esserteaux, Fronsures, Hangard, Harbonnières, Longneau, Molliens-Vidame, Montdidier, Nesle, Plachy, Prouzel, Sains, Vraignes, and Vrely. In the Oise were Bonneuil and Esquennoy, and in the Aisne was Sauriennois (Fig. 7).

The woad industry was highly organized in the Somme district, as is well illustrated by the Ordinances in force at Corbie, a small town near Amiens. No less than thirty-six Ordinances are extant, showing the minute detail in which the industry was controlled.

expert workmen. (J. A. Barral and H. Sagnier, *Dictionnaire d'Agriculture*, 1900, iv, p. 52.)

[1] According to Barral and Sagnier (l.c.), woad is now cultivated only in the departments of Tarn and Gironde.

The following twelve Ordinances may be taken as fair specimens of the whole series:

BY-LAWS FOR THE REGULATION OF COMMERCE IN WOAD AT CORBIE

The By-laws for the regulation of commerce in woad were made and published in the town of Corbie, after being agreed upon by the Town Council on behalf of Monseigneur de Corbie and the inhabitants of the town, for the general advantage of the woad merchants who trade in the said town of Corbie.[1]

I. It is hereby decreed by Monseigneur de Corbie that if any merchant buys woad at the market of Corbie, he shall not re-sell it under eight days, and that he shall empty his sacks on the ground so as to display his woad. Penalty 20 sous.

II. No merchant shall buy or sell woad at the market of Corbie or in the outskirts of the town until the sacrament bell has rung, nor on other days until the collector of tolls or his agent shall have struck the beam and thus given the signal. Penalty 10 sous.

III. No merchant shall forestall the market before the hour of opening, unless he has bought the woad for himself or for another merchant. Penalty 10 sous.

IV. No broker shall buy woad during the market hours except for a merchant, unless he has a partner and shares the barrel of woad.

V. No broker who buys for another person can on the same day make further purchases for him. Penalty 20 sous.

VI. No merchant who brings woad to sell on the Corbie market or in its outskirts shall buy more woad, as long as he has any of his own to sell, nor may he make any bargain. Penalty 40 sous.

[1] A. Thierry, *Recueil des Monuments Inédits de l'Histoire du Tiers État*, 1856, iii, pp. 589 f. These By-laws probably date from the year 1467, when the various trades of the town of Corbie were reorganized.

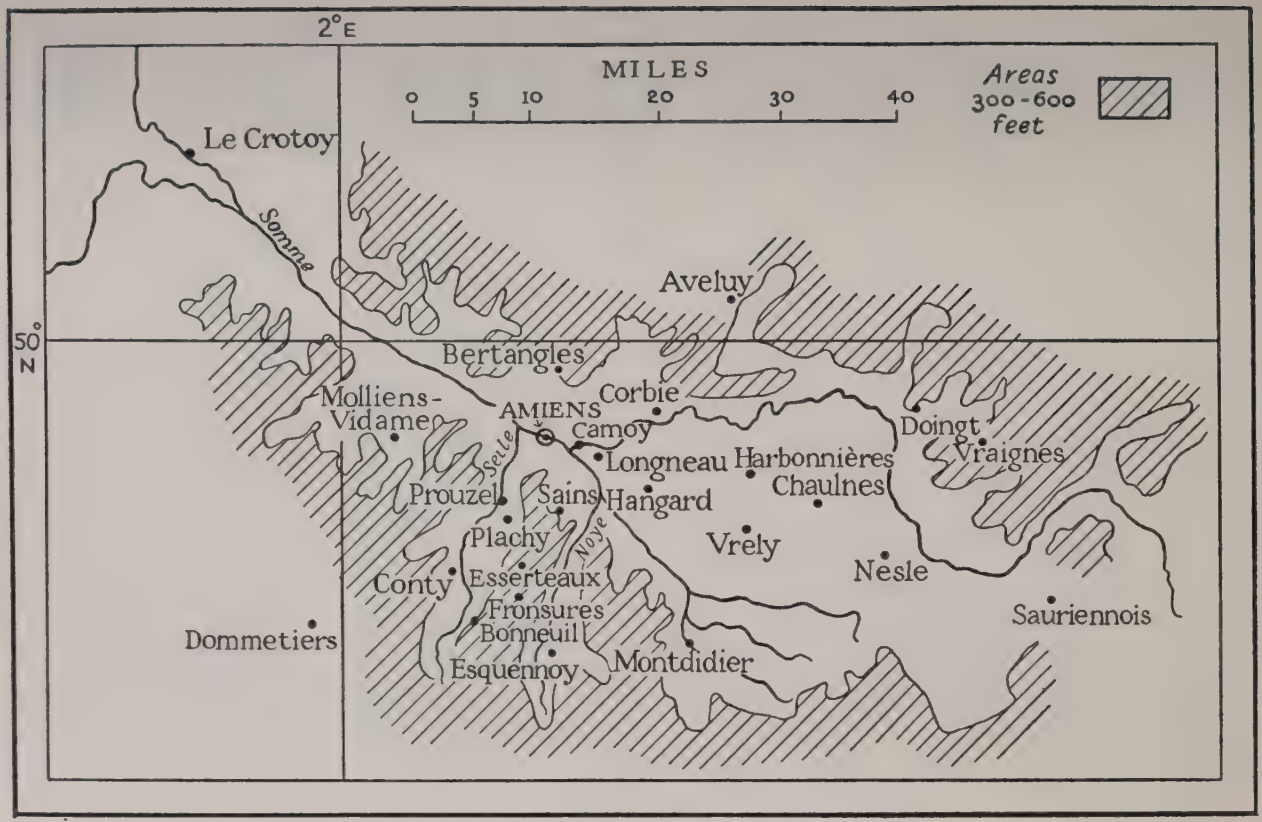


FIG. 7. Somme Woad District

VII. No merchant shall offer woad for sale before the feast of St. Remy; if he has done so he shall remove it.

Penalty 40 sous.

VIII. No person is allowed to advise another to sell his woad, nor to offer it on another market, unless he is pressed upon to do so. Penalty 10 sous.

IX. No person is allowed to buy woad for more than one other person, until the first sale has been completed, unless they are sharing a barrel of woad. Penalty 40 sous.

X. Every merchant shall place his sacks of woad on the right side and beyond the causeway, as he faces the Abbey, up to the feast of St. Remy. Penalty 40 sous.

XI. No person shall sell woad for a tithe unless it be pure. Any person breaking this Bye-law shall be fined at the discretion of Monsieur de Corbie.

XII. No person shall sell woad above the causeway, as he passes the Abbey on the left, up to the feast of St. Remy.

Penalty 40 sous.

Monseigneur de Corbie gives notice that each and all of the above By-laws must be strictly observed and the associated penalties enforced. If any By-law is broken the defaulter shall submit to the judgment and arbitration of the provost. These By-laws are to be promulgated every year at the feast of St. Magdalen.

It is of interest to learn that the woad industry was so highly organized in a small town like Corbie.[1] Doubtless a similar development had been reached in other woad towns of Picardy, although the details have not been preserved.

In the archives of Amiens we read in 1405 and 1424

[1] These ordinances may be compared with those of other French towns. Cf. R. de Lespinasse, *Les Métiers et Corporations de la Ville de Paris*, 1897, iii, pp. 113 f.

WOAD MERCHANTS (AMIENS CATHEDRAL)

of a 'provost of the woad merchants', a term which clearly points to some degree of organization.[1]

The old industry of Picardy is recalled by the fact that the survey offices (cadastre) are still called 'le moulin á waide', sometimes spelt 'á vette, Havette'.

At Amiens also some traces may still be found. On the south exterior wall of the nave of the cathedral there are sculptured two woadmen, standing by the side of a sack of woad balls, and above them is a statue of St. Nicholas (*c.* 1400–10), who was looked upon as the patron saint of the woad merchants of Amiens. Doubtless he was selected partly because he was the protector of merchants and mariners in general, and partly because woad was largely exported from Amiens by sea (Pl. XVII). The second trace will be found in a vault under a house in the Place Florent Caille, which was once a workshop in which woad dye underwent its final preparation for the vat, and where pits, ovens, and stone tables can still be seen.

Lastly, in Amiens cathedral there remain some panes of glass (13th century) with inscriptions of two 'mayeurs des banières des waidiers'; these probably relate to a guild of woad merchants whose regulations have perished.[2]

(*c*) *Normandy*

Lower Normandy was another centre of the woad industry although not so productive as the two districts already described. Woad was usually called vouède or petit pastel in Normandy and yielded less pigment than did the woad from the Languedoc.[3] This was possibly

[1] A. Thierry, l.c., ii, pp. 25, 94.
[2] Ibid., l.c., i, pp. 307, 513.
[3] Savary des Bruslons, *Dictionnaire du Commerce*, 1726, i, col. 370.

due to the lower temperature of North France causing an inferior development of the foliage.

According to Magneville[1] the cultivation of woad in lower Normandy may be traced back to 1292, and gradually became very extensive. In early times large quantities of woad grew near Caen, and in the communes of Ifs, Cormeil, Benouville, Allemagne, May, Giberville, Sanerville, and Cagny were woad centres. In more recent times (1811) there were scattered fields of woad in the communes Luc, Langrune, and Douvres. Several localities, according to Magneville, still bear the name of 'voüede'. Woad mills were frequently referred to in the 15th century, the last allusion being dated 1536. An interesting memorandum states that there was at one time an octroi of woad.

At one time Normandy had a very extensive trade in woad, but this rapidly diminished when tropical indigo appeared on the scene. Woad was also grown on a smaller scale in Alsace and in Provence.[2]

B. WOAD REGULATIONS

The knowledge of dyeing probably spread from Italy to France, where the industry in quite early times was divided into two classes by the State, one including the 'dyers of fast colours', and the other the 'dyers of fugitive colours'. Dyers of the last class were forbidden

[1] M. de Magneville, 'Recherches sur l'ancienne Culture du Pastel dans la basse Normandie', *Rapport Général sur les Travaux de l'Académie de Caen*, 1811.

[2] There appears to have been some cultivation of woad in Flanders. The French government evidently found this crop an advantage to itself, for it sent a considerable quantity of woad seed gratis to that country. Both in France and in Flanders woad was grown at times as a fodder plant. (J. C. Loudon, *Encyclopaedia of Agriculture*, 1871, p. 81.)

to use or even to have in their possession the dyes allocated to the other class.

In 1383 certain ordinances were passed known as 'the Règlements du Prévôt de Paris'.[1] These ordinances were revised from time to time, but never succeeded in controlling the industry satisfactorily. The two classes of dyers continually broke the rules laid down for their guidance and trespassed on one another's domain.

In the days of the famous statesman J. B. Colbert (1619–83), during the reign of Louis XIV, the whole question of the dyers' art was considered afresh, and the result was the passing, in 1669 and the following years, of fresh legislation, by which the dyeing industry was placed on an entirely new basis. The principal enactment was entitled the 'Instruction générale pour la Teinture des Laines et Manufactures de Laines de toutes Nuances, et pour la Culture des Drogues ou Ingrédients qu'on emploie'.

Colbert supported the prevalent prejudice against exotic indigo and regarded it as inferior to woad. The use of indigo by itself therefore was prohibited, but it might be used in conjunction with woad, in the proportions of 6 lb. of indigo to one bale of woad.[2]

Numerous regulations were made, enforcing the use of certain fast dyes for high-class materials, prohibiting other dyes, appointing inspectors of dyers, and many other details.

French dyers were now organized in three classes or *communautés*. The first class (A) included master dyers who used what were called fast dyes. The second class

[1] Many details will be found in Savary des Bruslons, *Dictionnaire du Commerce*, 1726, ii, col. 1718 f.; R. de Lespinasse, *Les Métiers et Corporations de la Ville de Paris*, iii (1897), pp. 113 f.

[2] The penalty for using indigo by itself is referred to in Ch. xvi, § B.

(B) included master dyers who used cheaper and more or less fugitive dyes, while the third class (C) included dyers of small articles in silk, wool, and linen. They were also allowed to deal with certain specially assigned kinds of cloth (teinturiers du grand et bon teint; teinturiers du petit teint; teinturiers en soies, laines et fils).

The pigments which the three sections of dyers might use were also divided into three groups.

Dyers of Class A used only the best and fast dyes, such as woad, indigo (in the proportions mentioned above), madder, and weld, and dealt with cloths of a width of at least $1\frac{1}{2}$ ell[1] and other expensive woollen articles of the best quality, such as the manufactures of the Languedoc, Carcassonne, Sedan, Abbeville, Dieppe, Rouen, and other cloth-making towns.

Woad was exclusively reserved for the use of Class A dyers, who were subject to strict regulations.[2] Blues, reds, and yellows were generally speaking reserved for dyers of the first class, except that the yellow weld might under special conditions be used by the second class. Mordants were also reserved for the first class.

Dyers of Class B, who used fugitive dyes, dealt with woollen fabrics of an inferior quality, e.g. those worth not more than 40 sous the ell, as well as with certain manufactured articles made of silk, wool, or flax. They were allowed to use cheaper and less stable dyes such as logwood, archil, and verdigris. These dyers might also use black, grey, and light or dark brown dyes, but they were not allowed to gall or black their cloths, until such cloths had first received a ground either of woad or of

[1] A French ell measured 54 inches.

[2] A good summary of the regulations will be found in Savary des Bruslons's *Dictionnaire du Commerce*, 1726, ii, col. 1732. Cf. also *The Whole Art of Dyeing*, 1705, p. 190.

woad and madder. Thus it was mainly the quality of the dyes and the value of the fabrics that distinguished the Classes A and B.

Certain other dyes might be used both by Classes A and B. Amongst them were the root, bark, and leaves of the walnut, a kind of oak, nut galls, sumach (*Rhus Coriaria*), copperas, and fouic (a French plant whose leaves stain black), and redoul (*Coriaria myrtifolia*) belonging to the *Coriariaceae*. A certain number of fugitive dyes might not be used either by the first or second class of dyers. Amongst these were brazil wood, annatto, and sumach.

Dyers of the third class (C) were restricted to inexpensive and small articles in silk, wool, or linen, more especially to these materials while still in skeins before they had been woven.[1]

Another regulation provided that all fabrics dyed with fast colours must be provided with rose- or rosette-shaped labels of various colours, so as to indicate the dyes which had been used, the order of their use, and that they were such as the regulations prescribed. These labels, of which there were five, were also inscribed with the name of the dyer, the place of his abode, and any other necessary details.

Label I was inscribed 'Woaded, to be maddered'.

Label II was inscribed 'Woaded and maddered, to be dyed black'.

Label III was inscribed 'Dyed in blue, to be galled'.

Label IV was inscribed 'To be dyed with weld'.

Label V was inscribed 'To be dyed with crimson'.

[1] This third class of dyers was again subdivided into three groups, corresponding with the three kinds of material with which they worked. Every dyer was obliged to keep strictly to his own material when once he had made his choice.

The cloth merchants would thus be assured that all the regulations had been carried out.

The regulations also provided for strict inspection of every master dyer's work by a jury who examined the fabrics which had been dyed as well as the dyes themselves. In case of any breach of these regulations the dyed cloths were confiscated and the dyer was mulcted in a fine of £150.

The regulations further described many tests by which the permanence and reliability of dyes might be ascertained. The following is the procedure recommended for ascertaining whether black woollen fabrics have been dyed with both woad and madder.

TEST FOR ASCERTAINING WHETHER BLACK CLOTH HAD BEEN WOADED AND MADDERED

Two pieces of cloth were required for this test (*débouilli*). The first was a specimen of cloth that was known to have been dyed with specified standard colours, and that was preserved for the purpose of identification at the bureau of master cloth manufacturers and master dyers. The second was a specimen of the cloth whose correct dyeing was under examination. Equal quantities of alum and cream of tartar, each weighing as much as each of the two specimens of cloth, were then mixed together, dissolved in water, and heated. As soon as the solution reached the boiling-point the two samples of cloth were placed in the water and boiled for half an hour. They were then removed from the water and compared with one another. If the specimen of cloth under examination had only been woaded it would exhibit a bluish colour with a greenish-brown tinge. If it had been both woaded and maddered, it would have a

dark-grey colour. If it had been neither woaded nor maddered, the cloth would have no greenish tinge but a yellowish-brown one.[1]

The important regulations that have now been summarized were embodied in Statutes passed in 1669 and amended in 1672. As a result the whole art of dyeing was advanced, beautiful colours and shades being evolved which pleased the fashionable world.[2] France indeed seems to have stepped into the shoes of Florence, which had for so many years set the fashion; in some colours indeed it surpassed every other country.

Meanwhile every effort had been made to encourage the use of home-grown woad, indigo only being permitted in the proportions stated above. Not till 1737, when Colbert's regulations were revised, were dyers allowed to dye with indigo alone if they wished to do so. Thus until comparatively recent times the State in France strictly controlled the dyeing industry and the pigments which might legally be employed.

C. THE EXPORTATION OF WOAD

France consumed large quantities of woad in its home industries, and also at an early date became an exporting country. During the reign of Charlemagne, Toulouse woad was exported from Marseilles and Narbonne.[3]

In the 12th century French wine, to which the English were greatly addicted, was regularly sent from Bordeaux across the channel to Southampton, and consignments

[1] Bruslons, l.c., i, col. 1649.

[2] Colbert, who did so much for the advancement of dyeing in France, magnanimously published the results of his researches, so that the whole world might reap the benefit of the discoveries that had been made.

[3] E. Levasseur, *Histoire du Commerce de la France*, 1911, i, p. 39.

of woad frequently formed part of the same cargo. Woad, again associated with wine, appears early amongst the goods dealt with at the port of Amiens.

By the beginning of the 13th century woad was being exported from St. Valery, at the mouth of the Somme, to Southampton, and soon afterwards a woad staple was established first at Calais and subsequently at Le Crotoy, also at the mouth of the Somme and opposite to St. Valery.

Later on in the 13th century there was an active trade between the woad merchants of Picardy and London, resulting in the important Compact of 1237, which has been described in detail in Ch. vi. This trade went on for many years and was still prosperous in 1294. In the next century it is recorded that a merchant of Amiens, named Jean le Meir, crossed the Channel to Colchester in order to convey eleven barrels and a pipe of woad to that town.[1]

On various occasions a keen competition for woad arose between the French cloth manufacturers living in Carcassonne, Alby, and neighbouring towns, and their English rivals in the cloth industry, so much so that regulations were drawn up so as to protect the French cloth industry against undue exportation of the woad dye to England. Indeed King Philippe le Bel, after consultation in 1303 with the cloth manufacturers of the Languedoc, for a time entirely prohibited any exportation of raw materials used in dyeing, including of course woad. This policy lasted till 1315, when

[1] Regulations drawn up at Amiens in 1286 prescribed that each barrel of woad must contain ten English hogsheads. The small cakes of woad ('tourtels de waide') appear to have been worth $\frac{1}{2}d.$ (3 sous parisis) a hundred. (F. Michel, *Histoire du Commerce à Bordeaux*, i, p. 298.)

exportation was again permitted. The payment of a 10 per cent. *ad valorem* duty on woad was imposed by Charles le Bel and Philippe de Valois.

In 1333 regulations were drawn up by Philippe de Valois, under which the woad merchants of Amiens might export their commodities to Wales, Scotland, or Ireland, and these were renewed in 1349.

By the middle of the 14th century the Languedoc was regularly supplying woad both to Bordeaux and to Narbonne, from which it was shipped to Southampton and other English ports, a duty of 5*d.* being levied on every pipe of woad.

In the middle of the 16th century there was an export of much woad *via* Bordeaux to Antwerp and to Germany. Thus in 1546 40,000 bales of woad worth £15,000 were carried by a Dutch ship to Antwerp, while a Hamburg ship carried to Germany 2,200 bales of woad, each bale filling four frails.[1] This woad was dispatched from Toulouse to Bordeaux on barges, especially at the time of the great Bordeaux fairs. Before leaving France, however, the woad was sent down the Garonne to Chartrons, where there was a staple both for wine and for woad.

In the 16th century the total production of woad in France had enormously increased; from the single port of Bordeaux no less than 200,000 bales were annually exported. So important was this trade that even in wartime unarmed ships were allowed to enter the port and load up with woad.

[1] Guicciardini, in his description of the trade of Antwerp in 1560, states that more than 40,000 bales of woad were sent from France to Antwerp. As each bale was worth 7½ écus the total value amounted to 300,000 écus. (R. H. Tawney and E. Power, *Tudor Economic Documents*, 1924, iii, p. 172.)

The duties on woad imported into France under the tariff of 1664 were 15 sous per 100 lb., while exported woad paid 46 sous.[1]

Early in the 16th century tropical indigo was beginning to be imported into Europe in commercial quantities, and with its advent the golden era of the woad industry gradually passed away, in spite of energetic efforts to support it. These efforts will be described in Ch. xviii.

In the time of Napoleon, however, there was a temporary recrudescence of the industry at the beginning of the 19th century under the stress of a great war. To this a brief reference must be made.

D. WOAD AND THE CONTINENTAL BLOCKADE

A remarkable resuscitation of the woad industry in France occurred in connexion with the Continental Blockade, by which Napoleon I attempted to seal hermetically the ports of Europe against English commerce, while Great Britain retaliated by blockading all the European countries under Napoleonic rule. It was on November 21st, 1806, that was published the famous decree by which Napoleon proclaimed unrelenting war on English commerce, a war that embroiled the whole civilized world and only ceased with the overthrow of its instigator. After enumerating his complaints against England, Napoleon declared the British Isles to be in a state of blockade, interdicted all commerce with them, threatened to seize both English goods and subjects, forbade all trade in English and colonial wares, and excluded from French and allied ports any ship that had touched at those of Great Britain. Napoleon's

[1] Bruslons, l.c., ii, cols. 1001 and 1987.

object was to ruin England by excluding her goods from the Continent and thus to strangle her by her own wealth.

The gauntlet thus thrown down by Napoleon was promptly taken up by Great Britain, which replied by a similar measure of blockade. By an Order in Council on January 7th, 1807, Great Britain forbade neutrals to trade between the ports of France and her allies, under pain of seizure and confiscation of the ship and cargo. The countries affected by this Order were France, Italy, Switzerland, Holland, Austria, Russia, Prussia, and the Rhenish Confederation, Denmark, Spain, and Portugal, so that the Order amounted practically to a Continental Blockade; the French colonies were also included.[1] Further, England in order to stalemate her opponent extended her colonial conquests and gradually acquired control of the economic products of the tropics on which France and other European nations had become largely dependent. Meanwhile rigorous action was taken against neutral ships, especially such as traded to French harbours.

As a result of this policy the manufacturers of France and associated countries were deprived of their raw materials, and this was followed by a sudden and remarkable rise in the prices of commodities throughout France, Germany, and Italy (*c.* 1811). Raw cotton rose to 7*s.* and 8*s.* per pound, sugar to 5*s.* and 6*s.*, coffee to 7*s.*, and indigo to 18*s.* per pound, these prices being about ten times those then ruling in London.[2] As these colonial commodities had become a necessity to the

[1] H. F. B. Wheeler, *Napoleon, 1749–1821*, p. 183.
[2] T. Tooke, *History of Prices*, 1838, i, p. 311; J. H. Rose, *The Life of Napoleon I*, 1904, ii, pp. 103, 105, 218.

European nations for the enjoyment of life, their deprivation involved great hardships especially in the case of the poor.

Here we are merely concerned with exotic indigo, which had during the 17th century come more and more into fashion, and indeed had almost entirely replaced woad in the dye works associated with the great cloth-manufacturing towns of France.

France endeavoured to meet the crisis by growing woad on a large scale and attempting to extract sufficient indigo from the plant so as to replace exotic indigo, which could no longer be obtained from the tropics owing to the blockade.

Large rewards were offered by the government and local chambers of commerce for the discovery of an efficient substitute for tropical indigo which could be cultivated in temperate regions.[1] Special attention was directed to woad, and numerous researches into the methods for the extraction of indigo from woad were undertaken and published. If only enough indigo could be obtained from woad it might be employed as a substitute for exotic indigo and the grievous shortage in a blue dye would be overcome. So confident was Napoleon of his success in the substitution of home-grown blue dye for the tropical indigo that he prophesied that London merchants would soon have no use for their indigo except to throw it in the Thames. Two difficulties, however, prevented the practical accomplishment of this project. First, only a very small quantity of indigo exists in woad, and secondly, the indigo that does occur is only in the form of an unstable organic

[1] Napoleon offered a prize of 500,000 francs for the best method of extracting indigo from woad.

compound which cannot be extracted as easily as is possible in the case of the exotic indigo. Indigo is obtained from the *Indigoferas* by simply soaking the leaves in cold water for a few hours, agitating the contents of the macerating vat and allowing the indigo to settle. In the case of *Isatis tinctoria*, however, no such simple process suffices. A certain quantity may be obtained by infusing the fresh leaves, adding an alkali, and precipitating with a dilute acid. But the indigo thus obtained is very variable in quantity, and a large proportion of the precipitate is not true indigo at all. Indeed no practicable method for extracting indigo from woad has yet been discovered which can be relied upon outside the chemist's laboratory.[1]

Various elaborate researches were carried out and a number of works were published, including those of Puymaurin, Heinrich, Giobert, and others.[2]

Perhaps the most important of these works was that issued in 1813 by Professor Giobert of Turin, and which was printed at the Imperial Press 'By Order of His Royal and Imperial Majesty'. This pretentious work described the various processes for extracting indigo from woad, including that which Giobert considered 'preferable to all others'.[3] This process consisted in pouring boiling water on the fresh woad leaves and leaving them in it for five or six minutes. The hot water was then run off and replaced by cold water, in which the leaves were allowed to soak for twenty minutes. The liquor was then aerated by agitating it, either with a

[1] C. B. Plowright, 'On the Archaeology of Woad', *J. British Archaeological Assoc.* ix (1903), pp. 95 f. Plowright gives a useful bibliography of woad.

[2] Cf. Bibliography.

[3] G. A. Giobert, *Traité sur le Pastel*, 1813, pp. 219 f.

proper special machine provided with a sort of paddle-wheel, or more simply with a broom, until a blue precipitate was deposited. In spite of many announcements, however, that the secret of extracting indigo from *Isatis* on an economic basis had at last been discovered, none of these processes were commercially successful.

Napoleon's hopes of discovering some plant amongst the indigenous flora of France that could replace the exotic indigo were doomed to disappointment. The abolition of the Continental Blockade by international agreement in 1812 brought the economic crisis and the shortage of indigo to an end. The attempt to resuscitate the woad industry was abandoned.

CHAPTER VIII

THE WOAD INDUSTRY IN GERMANY

THE woad industry in mediaeval Germany is of extraordinary interest owing to its high state of organization, and to the numerous side-lights that are thrown on the processes of production and consumption. Fuller statistics are available in connexion with the industry than can be found either in England, France, or Italy.

The subject may be discussed under the following heads:

A. EARLY DAYS.
B. WOAD DISTRICTS.
C. WOAD REGULATIONS.
D. WOAD GUILDS.
E. WOAD HALLS.
F. THE ASSAY OF WOAD.
G. WOAD STAPLES.
H. FINANCIAL RETURNS.

A. EARLY DAYS

No reliable information is available as to the date when woad was first cultivated in Germany as a source of dye. The early Teutons appear, if we may trust Ovid,[1] to have blackened their grey hair with woad and may also have daubed their skin with the same dye, as most primitive races were accustomed to paint themselves in some way or other, and woad was available for the purpose.

[1] 'Femina canitiens Germanis inficit herbis,
Et melior vero quaeritur arte color.'

The first historical date belongs to the middle of the 11th century, when the Slavs from the Orlagau presented to the monastery of St. Peter at Cologne a black pigment which was called 'worin'. It is almost certain that this 'worin' was woad, for at that period woad was almost invariably used when a black dye was required.[1]

The earliest authority for the actual cultivation of woad dates from 1236, when a decree of Count Adolf of Holstein refers to 'the woad with which cloths are dyed'.[2] As this passage also refers to a remission of the tax charged to the merchants of the Altmark on the woad which they were dispatching to Hamburg *en route* for Flanders, we may safely assume that the woad had for some years previously been a dutiable commodity.

Further, as enough woad was grown in the Altmark to allow of some of it being exported as far as Flanders, the plant was certainly cultivated at least as early as the 13th century.

As regards the districts of Cologne and Jülich the woad industry certainly goes back to the 13th and probably to the previous century, since at Cologne there was a woad market which had existed since the 13th century.[3] At first the woad trade was in the hands of one of the oldest guilds called the 'St. James's Fraternity' (Waidhändler-Zunft). In 1371 or 1372, however, the Cologne town council seems to have assumed control

[1] Hegi (*Flora von Mittel-Europa*, iv (i), p. 198) states that woad is referred to by St. Hildegard as 'Weyt', *c.* 1150; by Albertus Magnus as 'sandix', *c.* 1250; and by Konrad von Megenberg as 'Waitkraut', i.e. the herb woad, *c.* 1298.

[2] *Hanseatiches Urkundenbuch*, i, p. 277. Some early references to woad are given in Grimm's *Deutsches Wörterbuch*, 1922, xiii, pp. 1032 f.

[3] H. Keussen (*Köln im Mittelalter*, 1910, ii, p. 1) gives a plan of Cologne, showing the Waidmarkt lying north of St. George's and St. James's Churches. The latter church has now been destroyed.

both of the woad market and the woad trade, so that the Fraternity had ceased to exist by 1396.[1]

In Jülich the 'Fraternity of the Holy Cross', probably founded about 1330, was also a woad guild. All foreign merchants who wished to buy woad in Jülich had to become members of the confraternity.[2]

B. WOAD DISTRICTS

During the Middle Ages woad was grown over a large part of Germany, including such widely separated districts as Brandenburg, Meissen, Magdeburg, Saxony, Brunswick, Silesia, Thüringia, and the Rhine Valley. According to Hegi[3] woad grew in the whole valley of the Rhine from Bale to Wesel, as well as in the valleys of its tributaries, such as the Nekkar, the Nahe, the Mosel, and the Sauer.

Not every district in Germany, however, was able to cultivate woad on a profitable basis, since the plant for economic success required a rich soil, a suitable climate, and skilled husbandry.[4] The cultivation of woad in the favoured districts was usually carried on with a high degree of efficiency and yielded large profits to the

[1] H. von Loesch, *Die Kölner Zunft-Urkunden*, 1907, i, pp. 56, 138, 198 f.

[2] G. v. Below, 'Privileg f. d. Waidhandlerzunft der Stadt Jülich', *Beiträge z. Geschichte des Niederrheins*, 10, 1895, p. 186 f.

[3] G. Hegi (*Flora von Mittel-Europa*, 1906–12, iv (i), p. 195) gives in detail the distribution of woad in central Europe, including Germany, Austria, and Switzerland.

[4] Schreber describes a weed, the viper grass (*Echium vulgare*), which was sometimes mixed with woad so as to increase the number of 'balls' that could be obtained from the crop. This weed, locally known as 'woad-mother' (Waidmutter), not only weakened the woad plants among which it grew, but its leaves retained dust and mud which diminished the resulting dye. (D. G. Schreber, *Beschreibung des Waidtes*, 1752, p. 16.)

farmers.[1] The methods of cultivation closely resembled those adopted in England, but probably reached a higher level of productivity, at any rate in Thüringia.

There were two famous woad districts to which special attention must be called, owing to their large output, viz. the Thüringian and the Jülich districts.

(*a*) *The Thüringian Woad District*

The first reference to woad in Thüringia dates back to 1250, when we read of duties being levied at Erfurt, which were known as 'woad pennies' (*Waidpfennige*), although they were not represented by any special coins.[2] When in 1290 Rudolf von Habsburg led an expedition of Erfurt burghers and destroyed 60 robbers' castles in Thüringia, the burghers took some woad seed with them and scattered it amongst the ruins in order to prove to future generations that 'Erfurt had been there'.

Woad appears at this time to have been extensively cultivated throughout Thüringia (Fig. 8), since the Naumburger Chronicle reports that in 1305 the woad industry was highly prosperous, while in the course of the 14th century there were numerous commercial transactions in the commodity between various Thüringian towns such as Naumburg, Erfurt, Arnstadt, Weissenfels, Laucha, Mühlhausen, and Jena, where woad was

[1] A special implement called the 'great woad plough', drawn by six horses, was used in order to secure deep and efficient ploughing. (E. Wagner, *Waidbau und Waidhandel*, 1925, p. 4.)

[2] In the original the duties were described as 'denarius qui dicitur withphenik' and 'denarius qui dicitur wit'. P. Zschiesche, *Der Erfurter Waidbau und Waidhandel*, p. 40. (*Vereins f. d. Geschichte und Altertumskunde von Erfurt*, xviii, 1896.) The syllables 'with' and 'wit' are variants for woad. A 'woad lane' (Waidgasse) is alluded to in the same passage.

produced, and Görlitz, Zittau, Schweidnitz, Liegnitz, Breslau, Pirna, and Oschatz, where large quantities were consumed.

The five Thüringian towns of Erfurt, Gotha, Langensalza, Tennstedt, and Arnstadt were amongst the chief

FIG. 8. Thüringian Woad District

centres of the industry, and indeed were known as the 'woad towns' (*Waidstädte*). Apart from these towns there were at one time no less than three hundred villages in Thüringia which cultivated woad and supplied an excellent example of a localized industry. We may fairly assume that the economic prosperity of the Thüringian woad area was due partly to natural advantages and partly to agricultural efficiency.

(*b*) *The Jülich Woad District*

The following towns and villages cultivated woad in the Jülich woad district (Fig. 9):[1]

Ameln	Hasselsweiler	Lohn
Barmen	Hottorf*	Merken
Boslar*	Jülich	Münz*
Bourheim	Kirchberg	Pattern
Freialdenhofen**	Kirzenich-Mersch	Pier
Geilenkirchen	Koffern*	Rödingen
Gereonsweiler**	Körrenzig	Spiel
Gevenich*	Linnich**	Welldorf

The existence of no less than eleven woad mills scattered over a comparatively small area proves that the cultivation of woad must have been very extensive.

C. WOAD REGULATIONS

The regulations governing the woad industry are of interest from the point of view of mediaeval economics, and illustrate that gross interference with individual liberty and the narrowness of outlook which were characteristic of the period. The cultivation of the plant, the sale of the woad balls, and the marketing of the dye were all liable to taxation and were hedged round with vexatious restrictions. Erfurt, one of the emporia of the woad industry, will supply some examples.

It will be convenient to deal with:

(*a*) The Trade in Unfermented Woad Balls.

(*b*) The Trade in Fermented Woad.

[1] One asterisk indicates the existence of one woad mill; two asterisks that of two mills. The mill at Boslar, probably destroyed at the end of the 17th century, was the last survival. The terms 'Waidmühle' at Hottorf, 'Waidmüller' at Rödingen, 'Waidmarkt' at Cologne, still recall the extinct industry.

FIG. 9. Jülich Woad District

(*a*) *The Trade in Unfermented Woad Balls*

The farmers who cultivated woad also crushed the leaves in the woad mills, and out of the pulp manufactured woad balls, sometimes known as green woad, which they then sold in the adjacent towns.[1] They were not allowed to sell their woad in their own villages, nor to carry out the fermentation or couching process by which the woad was prepared for the dyer.[2] This was done by a separate class of persons inhabiting the towns who may be called 'woad refiners' (*waidbereiter*).[3]

In early days woad could be bought and sold in any part of the town of Erfurt. In 1351, however, Ordinances were passed regulating the trade in minute detail, one Ordinance directing that in the future woad should only be sold in the woad market.

The woad farmer, therefore, when he reached Erfurt, drove his wagon direct to the 'Waidanger', or woad market, and waited till the woad bell was rung by the woad master as a signal that business might start. There might be some hundreds of wagons laden with woad, and every driver was required to remain with his wagon, and above all not display the balls he had for

[1] The Erfurt authorities levied a tax of a groschen on every cask of balls, payable both by purchaser and seller. A similar tax was levied on any fermented woad that left the town.

[2] This procedure was in a marked contrast to that adopted in England, where woad farmers cultivated the woad plants, crushed the leaves, manufactured the balls, carried out the processes of couching, and finally dispatched the product to the market. Lauterbach (l.c., p. 31) states that the woad farmers were only allowed to couch an inferior woad consisting of leaves derived from several crops that had been mixed.

[3] This seems the best term to describe that class of dealers who purchased woad balls in order to carry out fermentation, with a view to then selling the finished product to the merchants.

sale. Meanwhile the would-be purchasers, i.e. the woad refiners, were not allowed to enter the market but had to wait in the side streets. When once the bell rang, however, business began in earnest, and we can picture the buyers wandering about amongst the carts examining the varying samples of balls, whose quality they tested by passing their moistened fingers over the surface and then smearing them over a sheet of white paper.[1] Meanwhile all bargaining was under the supervision of the woad master and his assistants. These various provisions were intended to ensure full publicity, as well as public control, the same object being promoted by the use of the market hall and of the town weigh-house.[2]

Another Ordinance forbade the woad farmer to sell his commodity to any one except to a refiner whose business was to couch the woad, no brokers being permitted.[3] Nor might he sell any woad in his own village or to any person who was not a burgher of Erfurt.

All sales of woad were at first conducted on a cash basis. The buyer must pay ready money for his purchase, even if the seller was willing to give him credit. Both the seller and the purchaser incurred heavy penalties, if this rule was disobeyed.

Forestalling or buying in advance was also prohibited. The Erfurt town council in 1575 made a regulation forbidding any farmer to sell his woad while it was still

[1] E. Wagner, l.c., p. 12. Another method of testing the quality of woad was to select a sample ball (Schauballe), and after breaking it in half to draw a line with one of the pieces across a sheet of paper.

[2] Further details are given by E. Wagner, *Waidbau und Waidhandel*, 1925, p. 14.

[3] At Cologne, however, brokers appear to have been sanctioned. Cf. F. Lauterbach, l.c., p. 33.

growing in the field or while it was being dried on the woad ranges.[1]

As soon as a bargain had been struck between the farmer and the refiner and the customary God's penny[2] had been paid, the farmer transported the balls from the woad market through the Weitergasse or else past St. Laurence's Church and the existing Schlosser mill and behind the Town Hall into the Michaelis Street to the public market hall. Here the exact quantity of woad was measured either by the woad measure (*Waidmass*), which held about 40 shocks of woad balls,[3] or else the balls were counted separately.[4] When this had been done, and the refiner had given the gratuity of a waid-groschen to the woad master and the woad measurer, the woad was conveyed through the Wagegasse to the couching hall. Here lusty woad porters carried the balls up to the spacious woad lofts, which comprised two floors one above the other. On these floors were often stacked as many as 16,000 or 17,000 woad balls arranged in heaps from three to six feet high. In due course the balls were smashed into powder with heavy wooden mallets, while the mass was sprinkled with water from time to time. Before long active fermentation set in, with the evolution of a great heat and so much vapour that the workmen could not see one another on account of the mist. The fumes emitted by the fermenting woad were very offensive and annoying to any houses and even churches in the neighbourhood.

[1] Many other Ordinances were made at Erfurt in the years 1612 and 1704. Cf. Schreber, l.c., App., p. 20.

[2] This was a fee paid as earnest money on striking a bargain.

[3] Each shock represented 60 balls.

[4] An Ordinance passed in 1704 enacted that the woad balls were to be of such a size that when grasped in a man's hand a twig could be laid on the ball without touching the fingers.

When the workmen had frequently turned over the woad and sprinkled it with water, it was finally left in a heap to dry for six or eight weeks. The product was then passed through a sieve, rammed into casks, and sold to the woad merchants. Eight Erfurt bushels went to a cask (*Kübel*), or sometimes 16 bushels were packed into a barrel (*Fass*).

(*b*) *The Trade in Fermented Woad*

In curious contrast with the above regulations were those governing the trade of the licensed woad merchants, who purchased woad that had been couched and who sold it to local dyers or exported it. They occupied a higher social position than did the woad refiners and naturally paid a higher price for the woad they bought. Thus if each woad refiner paid about 25 taler (£3 15*s*.) for a Kübel or cask of 4,000 unfermented woad balls, the woad merchant probably paid double that sum, viz. £7 10*s*., for an equivalent amount of fermented woad which he would purchase rammed into casks ready for export.

Every person who aspired to be a woad merchant had to obtain permission from the civic authority, who only granted a licence to privileged persons who paid a fee known as woad money (*Waidgeld*). Moreover, the applicant for a licence must possess an annual income of at least 1,000 gulden (£100), this financial stability being intended to prevent speculative dealings in woad by persons with insufficient capital.

In early times woad merchants appeared to have carried on business in any part of the town of Erfurt. After 1351, however, a regulation was passed forbidding the sale of any woad except in the public market and through a broker.

The sale of prepared woad to woad merchants was often a credit transaction. For instance, in 1550 a merchant dealing in woad, wine, and corn was owed 2,637 gulden (£262 14*s*.), while another merchant had debts of £3,500 owing to him.

In order to provide capital for trading in woad, companies were formed at an early period. Aliens, however, could neither form such a company nor invest money in it. A very curious regulation of these companies provided that all profits must be divided equally amongst the shareholders of a woad company. In other words every shareholder received the same dividend, whatever his holding.[1] Nor might any person own shares in more than one woad company or buy more than 150 casks of woad in any one season.[2] These provisions were intended to prevent the woad trade from falling under the control of a few capitalists, the political economy of the period deeming it best that as many citizens as possible should share in the large profits of the industry. Any shareholder who disapproved of this policy was banished from the town for a year, a specially severe punishment in mediaeval times. The revised woad regulations of 1575 contained the same provisions, except that the penalty was mitigated. The objector was no longer exiled, but his profits were forfeited to the town treasury.

There was an extensive export trade in Erfurt woad, the most important towns which imported the commodity being Nürnberg, Grossenhain, Görlitz, Breslau, Hamburg, Bremen, and Antwerp.

[1] F. Lauterbach, *Der Kampf*, &c., p. 32; H. Jecht, *Geschichte*, &c., p. 70.

[2] This restriction seems, however, to have been withdrawn in later years, as the accounts of the Erfurt merchant for the year 1617 show that he had traded with over 4,000 casks of woad.

We now pass to a brief account of some woad regulations in force at Cologne, which was the head-quarters of the adjacent Jülich woad district.[1] The regulations governing the sale of woad balls and of fermented woad at Cologne were not so clearly differentiated as those in force at Erfurt.

At Cologne the woad merchants required a special licence, and were only allowed to buy and sell in the woad market or in a specially licensed inn. No business could be done until after the first mass at St. James's Church.

Two 'weisse Pfennige' had to be paid as a tax on every cart-load of woad brought to the market.[2] It was also the custom to provide a bottle of wine for every cart-load of unfermented and two bottles for a cart-load of fermented woad. This wine was drunk when the bargain was made and gave it legal sanction.[3]

The wagons filled with woad usually arrived from the country in the morning, and the farmer was obliged as at Erfurt to remain by his cart all through the day, or else run the risk of doing no business. Every purchaser of woad had to pay a tax of 6*s*. (solidi).[4] No farmer who had his own woad to sell could help another farmer to sell his; every one must act for himself.

No merchant who had bought his woad in the country districts outside Cologne was allowed to buy any in

[1] Further particulars of the woad industry in the Jülich district may be found in G. v. Below, *Landtagsakten von Jülich-Berg*, i, pp. 255, 273, 335, 336, 517, 699, 703; ii, p. 182; M. Vassen, *Wirtschafts- und Verfassungsgeschichte der Stadt Jülich*, 1926, pp. 145 f.; *Quellen zur Rechts- und Wirtschaftsgeschichte der rheinischen Stadt Düren*, p. 230.

[2] A Weisspfennig or Albus was = 10 Pfennige.

[3] H. von Loesch, *Die Kölner Zunft-Urkunden nebst andern Kölner Gewerbe-Urkunden bis zum Jahre 1500*, i, pp. 198 f.; § 33, 36–8, 40, 42.

[4] A solidus was equal to *c*. 3½ marks.

the town, nor could he sell the woad he had bought in Cologne.

At Cologne as elsewhere there were woad brokers and woad measurers who were subject to strict regulations. Every broker had to take an oath that he would observe the following regulations:

(1) Not to buy or sell woad on his own account or allow any other person to act for him.

(2) Not to charge more than 12*d.* (denarii) for each measure of unfermented and 2*s.* (solidi) for each measure of fermented woad.[1]

If a broker bought woad in the country districts and then offered it on the Cologne market he was dismissed from his post and banished from the city for a year.

The measurers were also sworn officials, whose duty was to ensure that all purchases and sales had been accurately measured and that burghers dealt equitably with non-burghers. They were paid a commission of 4*d.* (denarii) per measure, and were fined 3*s.* (solidi) for each cart-load that had not been accurately weighed. Both at Cologne and Jülich the measurers had to report each day to the tax collector the quantity of woad that had been measured.[2]

Other regulations applied specially to woad dyers. For instance, if a dyer dyed with woad that had not been duly assayed, he was fined 4 florins (gulden), half of which went to the town treasury and half to the inspectors at the woad market.[3] If a dyer used

[1] W. Stein, 'Ordinancie van dem weytpennynghe', *Verfassung und Verwaltung der Stadt Köln*, ii, pp. 71, 119–21, 197. Each measure (Mass) was equivalent to eight bushels.

[2] Von Below, *Privileg für die Waidhändlerzunft der Stadt Jülich.*

[3] W. Stein, l.c., 1893–5, p. 305.

woad for dyeing silk he was fined five marks per pound.[1]

Apart from these duties payable to local authorities, woad had, like other commodities, to pay a tax when it crossed a frontier into another State. Indeed, as soon as a wagon-load of woad emerged from the gates of a town the great landowners and electors of every province pounced on the helpless woad merchant and exacted the woad tax (*Waidzoll*), amounting to a florin or a gulden per load. They also demanded fees for safe conduct.

When at last the consignment of woad reached the destination where it was to be used by the dyer, a further duty of a gulden was levied on every cart-load, while finally a duty was payable for the trouble involved in ascertaining that its stated weight was correct. No wonder that the cost of a commodity which was subject to so many State, civic, and commercial exactions reached a high figure!

During the Middle Ages Germany exported woad to many parts of Europe. Even as early as the 13th century woad was exported from the districts of Altmark, Meissen, Magdeburg, Brunswick, and Saxony, and this continued during the following centuries. Woad was at one time an important export to Antwerp, and even to England much woad was shipped by the Hanseatic merchants in the days of Elizabeth.[2]

[1] H. v. Loesch, l.c., 167, § 9.

Between 1597 and 1603 Hamburg exported the following number of barrels of woad to England:

1597–8	1598–9	1601	1602	1603
15	22	23	48 (6 sacks)	23½

[2] F. Lauterbach, *Der Kampf des Waides mit dem Indigo*, 1905, p. 53, gives further details.

Other exports of woad went from Germany to Poland, Hungary, and even as far as Italy, Thüringia and lower Austria (especially Waidhofen) being important exporting districts.

A brief allusion may here be made to the rise of a class of capitalists which came into existence in the 15th century. In the 13th and 14th centuries the woad trade was mainly carried on by individual traders, who often had to journey to and fro along some artery of traffic, purchasing their woad at one end of the high road, selling it at what was probably a staple town at the other, and then returning to the starting-place for a fresh supply. An extensive trade of that kind was transacted on the ancient highway, some 160 miles in length, which connected Erfurt with Görlitz. Along this highway flowed a constant stream of heavily laden woad wagons each carrying about 20 casks of fermented woad.[1] These traders purchased their goods on the Erfurt market, knowing that there was always a demand for them at the staple town of Görlitz, where buyers assembled from far and near, and especially from the remote provinces of Silesia, Poland, and Bohemia. Görlitz was in fact during the 13th and 14th centuries the woad emporium for the supply of neighbouring towns as well as for the resale of goods in transit.

In the 15th century Görlitz attained a still greater importance and became the centre of the vast woad trade going east. For example, *c.* 1470 there was an annual

[1] Another ancient artery of trade *c.* 120 miles long ran westwards from Erfurt to Frankfurt and on to Speyer, both of which towns became woad emporia. A third route ran south for *c.* 110 miles to Nürnberg. Woad going north was generally put on barges at the villages of Myla and Ebenhausen on the Werra, and shipped down the Weser to the Hanseatic towns on the Baltic.

turnover of about 9,000 casks of woad, amounting to 560 wagon-loads, which was equivalent to 1,200,000 balls of woad. This development appears to have been associated with capitalistic enterprise, from which all traders without financial resources were excluded. In fact at Erfurt an Ordinance was actually passed that every woad merchant must possess taxable property yielding at least 1,000 gulden a year. Poor traders might no longer deal in woad; their place was taken by rich or by wholesale merchants.

Some of these wealthy traders still drove their woad wagons on the weary way to Görlitz. But as a rule they no longer troubled to go themselves, but sent their employees to act for them. In many cases indeed the carmen were servants of woad companies, and both conveyed the woad to Görlitz and disposed of it on arrival. They then returned to Erfurt with the profits they had earned for their employers, as well as with any return freight they could pick up, consisting generally of wax and leather, as well as of some Görlitz textiles.

Later on, as the woad trade in Görlitz increased in importance, warehouses were established in that town, and the Erfurt merchants found it necessary to retain a permanent agent who would attend to their business. In this way a new stage in the evolution of industrial organization was opened up.[1]

As Erfurt may be regarded as the most important woad town in Europe, a short description of its topography from the point of view of the woad trade may be of interest.

[1] H. Jecht, *Geschichte des Ostdeutschen Waidhandels und Tuchmacherwerbes*, 1923, i, p. 78 (*Neues Lausitzisches Magazin*, 99, 1923), Jecht gives many other details of the woad commerce at Görlitz.

The central point of that trade was the 'Waidanger' or woad market, which extended from the Kaufmannskirche in the north to the no longer extant St. Bartholomäuskirche in the south.[1] The only remaining portion of the latter is its tower to which the woad bell was formerly attached. This church was formerly the Hofkirche of the Grafen of Gleichen, the former patrons of the city. The Grafengasse running from the 'Anger' in a north-west direction still recalls the early patrons. The east end of the existing Schlösserstrasse also formed a part of the 'Anger', and was formerly called 'Bei Lorenzen', as it reached as far as the church of St. Lorenz. When the woad trade was very active more space was obtained by an extension of the 'Anger' in a south-west direction.

As soon as a wagon-load of woad had been sold in the 'Anger' the purchased woad was driven away either through the Weitergasse or the Schlösserstrasse (i.e. the former 'Bei Lorenzen') to the junction of these two streets close to the Breitstrom, the chief tributary of the Gera, which traverses Erfurt. In mediaeval times this river was only crossed by a narrow wooden bridge called the 'Lange Steg', too narrow for the passage of woad carts, which had to ford the stream at a spot which can still be traced on its left bank. After crossing the river-bed the carts were driven through narrow lanes behind the Town Hall to the Michaelisstrasse, from which, by passing under one or two arches, the carts reached the Waagegasse or Weigh-house St. From the weigh-house they were driven on to the houses of the various woad merchants.

[1] The 'Anger' and most of the other streets and buildings can be identified on the map of Erfurt given in Baedeker's *Northern Germany*.

D. WOAD GUILDS

In Thüringia, where the woad industry was highly prosperous, woad guilds were established for the benefit of the workers engaged in the industry.[1] These guilds were of two kinds. The first (*Waidgilde*) included the workmen in charge of the complex couching or fermentation processes by which the woad was prepared for the dyer. Such a guild existed at Langensalza, the articles being kept strictly secret, so that no outsider might discover the method of preparing the dye. Every woad refiner possessed his own trade secrets and did his utmost to prevent them from becoming public. Success in producing the woad dye consisted largely in minute attention to detail. Even the workmen employed in these delicate operations were put on their oath never to reveal their special knowledge to any outsider. The Langensalza guild evidently included highly skilled workmen, since its dye at one time enjoyed the highest reputation on the market.

The second guild was in reality a guild of dyers. But inasmuch as for many generations woad was almost the only dye used by cloth manufacturers the term 'dyer' became almost synonymous with 'woad dyer'. This guild was therefore to all intents and purposes also a woad guild. Not till the end of the 15th century did madder come into general use.[2]

[1] Further particulars of woad guilds will be found in H. Jecht, *Geschichte des Ostdeutschen Waidhandels*, ii, pp. 82 f.; F. Lauterbach, *Der Kampf*, &c., p. 35; D. G. Schreber, *Beschreibung des Waidtes*, pp. 86–7.

[2] At Nürnberg there was in the 13th century a guild of dyers known as the 'Schwarz-, Schön- und Waidfärber', which may be translated as the 'dyers in black, dyers in bright colours, and dyers in woad'. Cf. J. F. Roth, *Geschichte des Nürnbergischen Handels*, 1800, iii, p. 235.

When first established, the Dyers' Guild appears to have owned a common dye-house, at any rate in small towns, doubtless so as to avoid the expenses which individual dye-houses would have involved. In large towns, however, each member of the guild had his own dye vat and dyed the cloths supplied by the cloth manufacturers. In 1464 the dyers at Görlitz erected a dye-shop for the whole guild, and this seems to have been in such demand that another shop was opened in 1472.

In Görlitz during the 16th century dyers were divided into dyers in woad (also called blue or black dyers) and dyers in madder (red dyers). The woad dyer worked under his guild and was paid according to his output; he usually worked in the dye-house belonging to the guild. A regulation of 1583 enacts that he must not trade either in wool or in woad on his own account—a rule, however, that was not always enforced.

The dyers in madder were not members of the guild as were the woad dyers, but were independent craftsmen. Their wages, however, were subject to the general regulations governing manual labour.

In spite of the existence of the Dyers' Guild much independent dyeing seems to have been carried out by the cloth weavers, who evidently were strong enough to defy the Dyers' Guild when they chose.

Thus dyers might be grouped into three classes:

1. Dyers who owned their own vats and who dyed cloths for sale in the market.
2. Cloth-makers who dyed their own woven fabrics.
3. Dyers who were permanently employed by large firms who carried on the manufacture of cloth.

It is clear, therefore, that the Dyers' Guild in Thüringia was never strong enough to include all the

dyers in their fraternity. The guild of clothiers was able to control a large share of the dyeing industry and doubtless also to keep down prices.

In Cologne the woad trade was, as already stated, in the hands of a guild, the 'St. James's Fraternity', which was organized partly on a religious and partly on a commercial basis.[1] The regulations of the guild were at the same time the regulations for the woad trade; probably the guild had the monopoly for woad.

According to the regulations the masters of the guild were obliged to choose the wardens of the woad market. No members of the woad guild might trade in woad with a non-member. A woad merchant who charged too much for his dye was fined one mark, and was not allowed to do any business until he had paid this amount. Any failure to comply with this regulation within a period of one year involved the loss of membership.[2] If a member of the guild wished to purchase woad and was unable to pay for the whole in cash, the woad merchant was obliged to accept some security for the part of the purchase which was not paid for.

E. WOAD HALLS

Almost every town inhabited by dyers possessed a 'woad hall', where woad from the surrounding districts could be warehoused, and where its quality could be tested by the woad inspectors or wardens. Thus Cologne, Frankfort am Main, Nürnberg, and the important towns in the Lausitz district, such as Görlitz, Zittau, as well as Schweidnitz in Silesia, each possessed their own woad hall.

[1] 'Der Waidmarkt', by Bertram, *Stadt Anzeiger*, 8 Nov. 1916.

[2] Von Loesch, p. 198, §§ 32–42; 56 x, 139 x, 204, § ii.

In early days the woad farmers were obliged to store all the woad brought into the town in these halls.[1] Later on, however, this rule was relaxed in many towns and the woad merchants were then permitted to store their woad in their own houses. Even then, however, no one could purchase any woad until it had been examined by the inspectors. This rule, for instance, was enforced in Schweidnitz as early as 1335. In Nürnberg also every citizen was obliged to allow his woad to be inspected; neglect to do so involved a fine of 2*s*.

A town derived a considerable income from its woad hall. For instance at Nürnberg every wagon-load of woad paid a tax of a florin (gulden), and a truck-load of woad a tax of half that sum to the local treasury. Every non-burgher was obliged to store any woad he had brought into Nürnberg in the woad hall, to allow it to be inspected and to leave it there until he had found a purchaser. When once he had paid the dues he might leave the woad in store for a whole year without further tax. In later times any woad that was stored in the woad hall was exempt from distraint for debt. The burgher had the right to store woad in his own house for a period of three weeks, without paying any duty; after this period, however, he was required to pay a duty of a florin. The same rule applied even when an outsider had bought woad from a burgher.

According to a later ordinance passed in 1583, any woad that had been stored in the woad hall for over a year was liable to a fresh tax, while every burgher was still compelled to store his woad in the hall. These irksome regulations illustrate the fetters by which commercial enterprise was shackled.

[1] Similar woad halls were provided in other countries such as Italy.

The revenues which Nürnberg derived from its woad hall during several years in the 14th and 15th centuries have happily been preserved, and indicate the increasing sums received by the town:[1]

In 1377 the receipts were £96 (Pfund).
In 1382 the receipts were £121.
In 1387 the receipts were £184.
In 1392 the receipts were £270.
In 1396 the receipts were £354.

In the years 1431–40 the following wagon-loads of woad were brought to Nürnberg and yielded the following income to the town:[2]

		£
1431	238 wagon-loads	Receipts 261·90
1432	231 „ „	„ 251·65
1433	196 „ „	„ 211·90
1434	270 „ „	„ 295·50
1435	196 „ „	„ 211·20
1436	222 „ „	„ 241·60
1437	207 „ „	„ 225·70
1438	162 „ „	„ 174·15
1439	169 „ „	„ 181·35
1440	217 „ „	„ 235·35

The duties levied at Nürnberg during the years 1430–40 were 2*s*. for every wagon-load, half as much for every truck-load, and payment could be deferred till the woad had been sold. The collector of taxes, to whom the tolls on woad had to be paid, received for his trouble 16*s*. per annum. The woad measurers and inspectors (wardens) received *c*. 4*d*. for every cask of 8 bushels, and *c*. 6*d*. for every cask of 12 bushels.

[1] F. Lauterbach, l.c., p. 37, gives many further details.
[2] Ibid., *Der Kampf des Waides mit dem Indigo*, p. 38.

F. THE ASSAY OF WOAD

The best idea of the lengthy procedure associated with the assay of woad will be gained if we follow the itinerary of a woad merchant on reaching a staple town, such as Grossenhain, about the year 1491, in the hope of selling his consignment of woad.[1] On arrival he drives straightway to the woad hall, where his woad is unloaded by the official porters and placed on a dry floor in this hall. Here it is thoroughly well stirred up by a licensed 'mixer',[2] so as to ensure that the whole consignment shall be of uniform quality; after this it is collected into a heap. The merchant next reports himself to the official assayor (who must belong to the cloth trade), and requests him to assay and value his woad.[3]

On the day appointed for the test, the assayor, accompanied by several assistants and by the woad merchant, assemble in the woad hall. Here a sack is filled from the heap of woad and conveyed by a porter to a dye-house, which has been lent for the purpose by a master clothier, and where an equally responsible dyer carries out the actual assay.

For this purpose the woad is first of all placed in the vat and repeatedly sprinkled with water, after which three samples of raw wool, each weighing 20 lb., and three pieces of cloth, each weighing 30, 35, and 40 lb. respectively, are dyed, the coarsest wool and cloth being

[1] H. Knothe, *Neues Lausitzisches Magazin*, vol. 58, pp. 258 f.

[2] In every staple town there was a horde of officials awaiting the stranger merchant, each of whom expected some fee in return for his services. Amongst these were porters (*Werfer*, *Setzer*), packers, meters, weighers (armed with weighing machines), assayors, and valuers.

[3] At Görlitz there were four official valuers who must belong to the guild of clothworkers. (H. Jecht, *Geschichte des Ostdeutschen Waidhandels*, p. 68.)

selected for the purpose. The dyed cloths are then washed, dried, and carefully weighed, after which the value of the woad which is being tested is fixed by the assayors, who must meanwhile be closeted alone and in a private apartment, so as to avoid any risk of undue pressure or bribery.

The price fixed depended on whether the last-dyed samples of wool and cloth had taken on the same depth of colour as had the first. If the last-dyed samples were of lighter colour than those dyed first, the woad was adjudged of inferior quality; if of a deeper colour the woad was of the best quality. The price fixed by the valuers varied from 9*s*. to 19*s*. the *Mass* (8 bushels) according to the state of the market.

While these various tests were being carried out the woad merchant was obliged to cater for all those concerned in the operations, and finally to provide them with a sumptuous repast. At the conclusion of the tests the valuer communicated to the woad merchant the price which had been fixed for his wares. If the woad merchant was satisfied he was allowed at least four weeks during which he might offer his woad for sale. If, on the other hand, he considered the price fixed too low he could demand a second test, when the same lengthy programme was repeated. Such a tedious procedure must obviously have been most galling for the merchant. In addition to the cost of storing his wares in the woad hall, he had to remunerate a whole troop of officials. He had further to keep his carters and his wagons for five or six weeks at an inn, involving a heavy draft on his purse, while at least a sack of his woad had been wasted by the assay. He was practically obliged to accept the price which the valuer, acting in the interest

of the cloth manufacturers, had fixed. Finally, the time that had been wasted during the assay increased his difficulties in disposing of his woad.

G. WOAD STAPLES

A staple town was one that had been appointed to be an emporium for certain commodities which must be bought or sold at such a town. Such staple towns were established as early as the 14th century. Thus there is evidence of a woad staple at Görlitz in 1339, while at Schweidnitz a similar privilege was in force in 1356. Frankfurt and Zittau acquired the staple some years later.[1]

Woad might only be warehoused in such towns as had been appointed staple towns, and at these every neighbouring town was obliged to purchase such supplies of this indispensable dye as it required.[2]

Every town that possessed a woad staple derived considerable benefit from the privilege. Its exchequer was enriched by the duties levied on woad merchants who brought their wares for disposal, its cloth manufacturers enjoyed the best opportunity of buying in the best and cheapest market as compared with other towns, and the assaying of woad was a further source of profit. Moreover a considerable number of inhabitants obtained a remunerative employment, while the whole town benefited from the prolonged sojourn both of the merchants, who came to sell woad, and of the clothiers, who came to buy woad.

[1] A good account of staple towns in Germany will be found in the *Handwörterbuch der Staatswissenschaften*, 1911, vii, pp. 808 f.

[2] H. Jecht, *Geschichte des Ostdeutschen Waidhandels*, pp. 66, 69. In course of time Görlitz became a noted emporium of woad, in fact a 'woad town', although not in the same sense as the five Thüringian towns mentioned above in which woad was cultivated.

Other advantages accrued from the fact that the outside merchant might only sell to a burgher and not to another outsider, while he was also restricted to wholesale business, leaving all retail trade to the local dealers.[1]

On the other hand, the outside merchant derived certain advantages from the establishment of the staple in a town as he was only obliged to visit a limited number of towns and also was sure of finding a market for his wares.

Towns had usually to pay heavily for the privilege of a woad staple. Thus at Görlitz the great landowners frequently borrowed money from the town, and these so-called loans were really compulsory if the town wished to retain the staple. Further, the town had frequently to entertain and make presents to these rich landowners, these various items involving considerable expense.

In spite of these drawbacks, however, Görlitz evidently derived great benefits from its staple, for it clung to this privilege with the utmost tenacity.[2] It retained the staple until about the middle of the 15th century, when it lost its privileged position.

In connexion with the woad staple at Görlitz a serious quarrel broke out about the middle of the 15th century between the woad merchants of Thüringia and those of Görlitz, the town which purchased most of the Thüringian woad. One cause of the quarrel was the fact that the coinage which was current in Görlitz, and in which

[1] In approaching a staple town the outside merchant was compelled to use the specified staple road, to avoid any risk of his escaping by another route and doing business elsewhere. This was known as the 'Strassenzwang'.

[2] Lauterbach, *Der Kampf*, &c., p. 43, describes the efforts made by Grossenhain to wrest the staple from Görlitz.

the duties on woad were levied, had a lower value than in Erfurt and the neighbouring towns, so that the Görlitz merchants lost from $\frac{1}{5}$th to $\frac{1}{6}$th of their money owing to the depreciated exchange. The Thüringian woad merchants repeatedly brought this grievance to the notice of Prince William of Thüringia, whose only response was to establish a second and rival woad house at Grossenhain, on the commercial route leading to the Oberlausitz and to Silesia. From 1477 onwards, therefore, the woad from Thüringia was stapled, tested, valued, and in part sold in Grossenhain, while only the surplus that had not been disposed of at Grossenhain went on to Görlitz. As a result, the Görlitz staple, although not altogether abolished, was to a large extent paralysed, while, on the other hand, the other Lausitz towns found themselves better off than before. Indeed it mattered little to them whether they bought their woad in Görlitz or in Grossenhain, while on the whole they rather rejoiced that Görlitz had been snubbed. Meanwhile Görlitz moved heaven and earth and spent much money in the effort to regain its staple.

H. FINANCIAL RETURNS

In the chapter on 'Woad in Economics' some account will be given of the wealth which the woad industry brought to the various communities that engaged in it. The first beneficiaries were the woad farmers, who reaped large profits in return for the strenuous and skilled work put into the woad fields. These profits stimulated a high standard of intensive cultivation, which in turn increased the profits, thus establishing a *circulus virtuosus*. This applied especially to the Erfurt district, whose numerous woad villages were famed far

and wide for their prosperity.[1] For example, about the middle of the 18th century many woad farmers made a profit of 400 taler (*c.* £60), while in the 18th century individual villages made a profit of 12–16,000 taler (*c.* £1,700–£2,260).[2] These figures must be multiplied tenfold if they are to represent modern purchasing power.

Not only did woad farmers make a good living, but the woad refiners and woad merchants occupying the towns also derived large profits from the woad trade. Indeed they formed the richest section of the community and there is evidence that many of the woad merchants did a lucrative business.[3] The exports of woad brought more money into Thüringia than all the other exports added together.

Apart from the farmers and merchants, however, there were many employees and other persons connected with the industry, such as porters, measurers, assayors, dyers, carters, &c., all of whom received good pay for their work.

Woad also increased the revenues of the churches, of the ground landlords, and of the State. For example, in

[1] Many of the following statistics are taken from E. Wagner, *Waidbau und Waidhandel*, 1925, pp. 20 f.

[2] In 1578 forty-nine villages in the neighbourhood of Erfurt cultivated 4344¼ acres (Acker) of woad. This would give an average of over 88 acres per village.

[3] Wagner, l.c., p. 18, gives further illustrations of the profits derived from the woad industry. Wealthy woad merchants of Erfurt were mainly responsible for the houses and churches, some in Gothic, others in baroque, which contribute so materially to the beauty and dignity of the town. On the other hand, no fortunes derived from woad could rival those of some wholesale merchants of south Germany, or compare with the famous Anthony Fugger, whose capital amounted to 5,000,000 gulden. At Erfurt, as has been pointed out elsewhere, business methods were in many respects thoroughly primitive and must have checked the accumulation of capital.

some instances churches owned woad mills and charged the farmers a toll for permission to grind their woad leaves. In the village of Friemar near Gotha there were no less than fifteen woad mills, and the charge for crushing the leaves varied from six to sixteen pfennige per measure (*Mass*) of eight bushels.

The ground landlords also levied tolls known as woad pennies (*Waidpfennige*) on the woad farms. The amount of these levies seems to have varied considerably; for instance, the landgrave of Thüringia in 1440 levied twelve groschen (*c.* 2*s.* 5*d.*) per acre.

Lastly, the State received large sums in the form of taxes; indeed the revenues derived from woad are said to have been sufficient to support Thüringia entirely.

Wagner states that in the prosperous days of the industry the woad that was exported brought no less than three tons of gold into Thüringia annually.[1] A ton is generally reckoned as equivalent to 100,000 gulden, equivalent to about 7,000,000 marks in present values, and this large sum only represents a fraction of the total revenues of the province.

These figures showing the revenues derived from the industry prove its economic importance not only for the woad districts but for Germany as a whole. They serve to explain the consternation which was aroused when a rival to the woad industry appeared in the form of exotic indigo and threatened the destruction of the native industry.

Some interesting statistics relating to the woad industry have survived, with the help of which two specimen balance-sheets have been constructed.[2]

[1] E. Wagner, *Waidbau und Waidhandel*, 1925, p. 22.
[2] Ibid., l.c., pp. 20–1.

CULTIVATION OF AN ACRE (ACKER) OF WOAD (*c.* 1746)[1]

BALANCE-SHEET

Expenses.	Taler	Gr.	Pfg.[2]
To rent of an acre of land	1	0	0
To cost of 6 loads of manure at *c.* 7 gr. each load	1	18	0
To cartage of manure at 3 gr. a load		18	0
To application of manure		1	0
To ploughing of land	1	0	0
To cost of woad seed		3	0
To cost of weeding (twice)	1	0	0
To cost of picking leaves (twice)		16	0
To cost of washing the picked leaves (twice)		4	0
To cutting the weeds above ground		1	0
To cost of carting the woad leaves, first to the water, next to the mill, and lastly to market		12	0
To cost of balling the woad		16	0
To wages of woad porters		4	0
	7	21	0
Profit	7	18	0[3]
Total	15	15	0

Receipts.	Taler	Gr.	Pfg.
By sale of 100 shocks of woad (at 4 gr. per shock of 60 balls)	15	15	0
Total	15	15	0

[1] The word 'Acker', here translated as 'acre', is a square measure which varied in different parts of Germany. In Saxony the 'Acker' was equal to 5,534 sq. metres.

[2] One taler may be taken as = 24 Groschen; one Groschen = 12 Pfennige. These values varied at different periods.

[3] The profit depended on the price obtained from the sale of woad. At times the price was only 1½ gr. per shock. In 1746 the price had risen to 4 gr.; in 1747 it fell to 2½ gr. Owing to the increased purchasing power of money the profits shown in these two balance-sheets were much greater than the figures appear to indicate.

A. v. Resch (*Sieg des Waid-Indigs über den Ausländischen Indig*, 1812, p. 14) gives another balance-sheet in which the cultivation of an acre (Acker) of woad cost 5 taler. The farmer sold his crop for 25 taler, leaving him with a profit of 20 taler. In the original the word 'balls' is apparently used instead of 'shocks'.

PURCHASE OF UNFERMENTED WOAD (2nd half 17th century)[1]

BALANCE-SHEET

Expenses.	Taler	Gr.	Pfg.
To purchase of 3,564 shocks of woad, each shock = 60 balls (at *c.* 2 gr. 10 pfg. per shock)	423	12	6
To unloading of woad carts at rate of 10 pfg. per cart	2	4	0
To couching 57 casks of woad at the rate of 6 pfg. per cask	14	18	0
To breaking the woad balls into powder; 12 women each receive 2 gr. per day	1	0	0
To gratuity paid to woad master *re* the purchase and couching of woad		12	0
To refreshments on three occasions to woad master and his assistants during the couching of woad	1	0	0
To cost of 12 barrels for packing woad, at 10 gr. per barrel	5	0	0
To nails for nailing up barrels			5
To insurance of 12 barrels at 10 pfg. each (12 pfg. = 1 gr.)		10	0
To cost of transport of 12 barrels at 1 taler 18 gr. each	21	0	0
To cost of warehousing 12 barrels of woad at Leipzig at 3 gr. each	1	12	0
To customs at Leipzig on 12 barrels at 6 gr. each	3	0	0
To commission at 2 per cent. on 180 taler. Each barrel sold for 15 taler	3	14	0
	477	10	11
Profit	122	13	1
Total	600	0	0

Receipts.	Taler	Gr.	Pfg.
By sale of 42 barrels at rate of 10 taler each	420	0	0
By sale of 12 small barrels at rate of 15 taler each	180	0	0
Total	600	0	0

[1] E. Wagner, *Waidbau und Waidhandel*, 1925, pp. 21–2. For comparison with English money the Taler, Groschen, and Pfennig may be taken as equivalent to *c.* 2*s.* 10*d.*, 1½*d.*, and ½*d.* The profit of 122 Taler 13 Gr. 1 Pfg. would in English money represent *c.* £17 7*s.* 2*d.*

The first exhibits the expenses and the profits involved in the cultivation of an acre (Acker) of woad in 1746. The profits made in any year would, of course, depend on the costs of production and on the selling price of woad balls. In the balance-sheet the acre of land is estimated to yield 100 shocks or 6,000 balls, and a profit of 7 talers 18 gr. (*c.* 22*s.* per acre). A farm of fifty acres would therefore yield a net profit of £55 per annum, which at the present money value would represent many times that sum.

The next balance-sheet shows the account of a woad merchant who invested 423 taler 12 gr. and 6 pfg. in the purchase of 3,564 shocks of woad balls (in all 21,384 balls). These were couched, nailed up in barrels, and dispatched to Leipzig, at a cost of 53 taler 22 gr. 5 pfg., and making a total expenditure of 477 taler 10 gr. 11 pfg. He then sold his woad at Leipzig for 600 taler, which left him with a profit of 122 taler 13 gr. and 1 pfg., equal to about £17 7*s.* 2*d.* This sum must be multiplied at least tenfold if it is to represent the present purchasing power of money.

CHAPTER IX

THE WOAD INDUSTRY IN ITALY

ITALY in the Middle Ages reached a high stage of industrial development which gave it a leading place amongst the commercial nations of Europe. Its principal towns, such as Florence, Venice, Milan, Genoa, Bologna, and others, vied with each other in the race for industrial supremacy.

At one period Florence, the capital of Tuscany, was perhaps the foremost industrial city, and owed its remarkable prosperity to the establishment of powerful guilds or 'arts', which were constituted almost like small states, with councils, consuls, or magistrates, a military officer or gonfaloniere and members, all governed by statutes. They also took a large share in the government of the city. Two of these guilds were closely associated with the woad industry.

We shall study in order:

A. WOAD DISTRICTS.
B. TWO FLORENTINE GUILDS.
C. THE WOAD DYERS.
D. THE WOAD HALL.
E. THE RELATIONS BETWEEN THE WOOL GUILD AND THE WOAD DYERS.

A. WOAD DISTRICTS

Woad was grown in many parts of Italy, including Genoa, Bologna, Chieri, Gualdo, Rieti, and the valley of the Tiber, as well as in Ancona and Calabria. Its main centre of cultivation, however, was in Tuscany in the woad district round Florence (Fig. 10), including

the neighbourhood of Arezzo, Cortona, Borgo San Sepolero, Castiglione Aretino, Montepulciano, and the Chianti valley.[1]

This concentration of the woad towns in the neighbourhood of Florence was associated with the famous

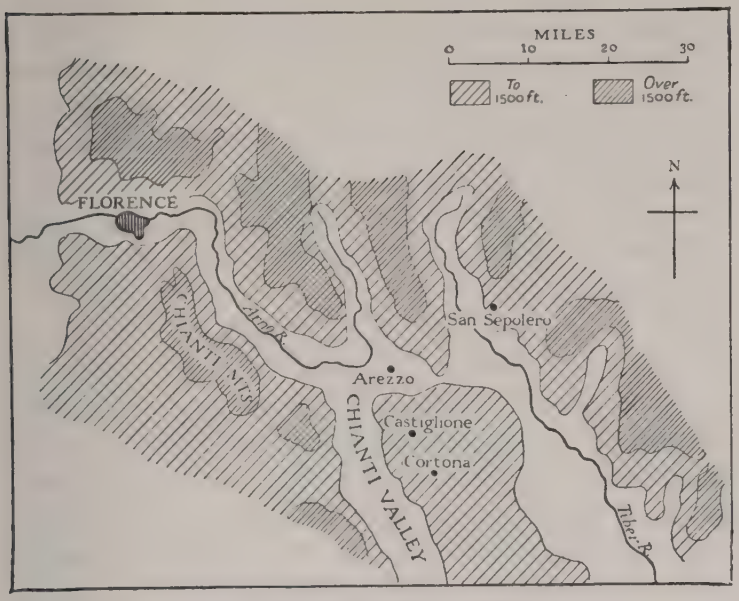


FIG. 10. Florence Woad District

wool and cloth industry localized in that city, which was one of the chief manufacturing centres of the country. A flourishing cloth industry stimulated the dyeing industry, which in turn promoted the sale of cloth, cause and effect reacting on each other in a beneficent economic circle. As we shall see later on, enormous quantities of woad were utilized in connexion with the woollen industry. In addition to the home-

[1] A. Doren, *Die Florentiner Wollentuchindustrie*, 1901, pp. 80, 529.

grown production considerable supplies of the dye were imported from abroad.

The methods of cultivation resembled those adopted in the south of France. In the warmer parts of Italy the seed was sown from September to October, while in the cooler districts March was preferable. According to Carton and Marcolongo,[1] two varieties of woad were cultivated. One had yellow seeds, the other violet seeds, the latter being considered the better of the two. Amongst the enemies of woad snails and locusts were amongst the most destructive. Mildew or rust formed yellow spots on the under surface of the leaves, and were due to a fungus of the genus Uredo. All affected leaves were removed.

B. TWO FLORENTINE GUILDS

The guilds of Florence supply the most remarkable example of industrial organization known in the Middle Ages, and throw an important light on the economic history of the period. These guilds included the citizens engaged in commerce and at first numbered twelve, seven of which were called the Greater Guilds, and five the Lesser Guilds, the latter being gradually increased to fourteen. Most of these guilds were as old as the beginning of the 13th century.

Two of these guilds, viz. the Calimala Guild and the Wool Guild, were closely associated with the woad industry and must be briefly referred to as an introduction to the latter. The principal guild was the Wool

[1] J. Carton and E. Marcolongo, *Manuale dell' Ingegnere Agronomio dell' Agricoltura*, 1892, 3rd ed., give further details as to the cultivation of woad in Italy. The word 'seeds' is probably here used for pods. These two varieties were also grown in the Toulouse district.

Guild,[1] or *Arte della Lana*. This guild imported large quantities of wool of a high quality from England, Flanders, and Spain, and out of it manufactured an excellent and admirably dyed cloth which became famous all over Europe.

The Wool Guild included the various crafts concerned in the production of cloth, e.g. the scourers, weavers, fullers, dyers, &c. In other words, it took charge of wool from the time it arrived in Florence until the manufactured cloth was handed over to the retail merchant. By the 14th century it had built extensive workshops, controlled abundant supplies of skilled labour, and accumulated considerable reserves of capital.

This guild became one of the most flourishing of all the guilds. In 1308 it owned at least 300 workshops, and annually produced 100,000 pieces of cloth of the value of 600,000 florins. Thirty years later the number of workshops had fallen to 200, producing only 80,000 pieces of cloth, but of the value of 1,200,000 florins, for the quality was better and the value of the output higher, 30,000 workmen being employed.

The members were divided into two classes known as the *membra majora* and *minora*, the division being more or less on a plutocratic basis. All the wealthy cloth merchants belonged to the first class, the important offices being reserved for them.

The second class included the humbler section of the guild members, e.g. the weavers, the shearers,

[1] An excellent account of the Florentine guilds and their relations to woad dyers will be found in A. Doren's three volumes, viz. *Die Entwicklung der Florentiner Zünfte*, 1897 (G. Schmoller's Forschungen, XV (1897); *Die Florentiner Wollentuchindustrie*, 1901; *Das Florentiner Zunftwesen*, 1908. Readers are referred to these volumes for further details.

the dyers, the fullers, the carders, craftsmen who possessed but little influence in the guild, and were in large measure subservient to the *membra majora*. Indeed, we shall see later on that they were oppressed by the latter.

To a still lower class belonged the common workmen, who although attached to the guild were not members and had no voice in its management.

The second guild to which we must refer was the Guild of Foreign Cloth Merchants, or *Arte di Calimala*, which probably originated in the 11th century and struck out in a business of its own, viz. the improving of the inferior cloths that at that time were being manufactured in Flanders, Holland, Brabant, and the north of France.

These cloths which the guild imported in large numbers were coarse and unsheared, as well as dyed with unattractive fugitive colours. Here the alert Florentine merchants saw a golden opportunity for a lucrative industry. They bought quantities of the cheap and coarse cloth, brought it to Florence, partly by sea and partly by land, and then by their unrivalled skill proceeded to convert the coarse cloth into an altogether superior article. They carded, sheared, trimmed, and rolled the cloth and removed all the knots that roughened the surface, with the result that a much finer article was produced which realized a much higher price. Above all, the cloth was dyed by the corporation of Calimala dyers with the most delicate colours, a branch in which the Florentine dyers out-distanced all competitors. Eventually the cloth was sold in the same markets of north-west Europe in which it had originally been bought. Large quantities also went to the East and were exchanged for

economic products of Asia, Constantinople and Alexandria being favourite markets. By the second half of the 13th century the Calimala Guild had achieved world-wide celebrity. By the 14th century (in 1338) the guild owned no less than twenty warehouses, and annually imported over 10,000 cloths worth 300,000 florins, which as soon as dressed and re-dyed were again placed on the market.

Thus the objects of the Lana and the Calimala Guilds were quite distinct. The first manufactured excellent cloths from both home-grown and foreign wool, while the Calimala Guild imported an inferior foreign cloth, and, after improving it in various ways, exported it as a superior and much more valuable commodity. Both these guilds dealt largely with woad. The importance of their operations will explain why immense quantities of that dye were required.

C. THE WOAD DYERS

Dyers are referred to as early as 1096 in the history of Florence, i.e. even earlier than are weavers.[1] At that time cloth-making was doubtless a purely domestic industry, the housewives weaving a coarse cloth, which was then fulled and finally dyed and fashioned into rough garments.

As early as 1212 there is evidence of a guild of cloth-workers, but the various branches of the craft do not appear as yet to have become organized. Much water had still to flow under the Ponte Vecchio before any complete organization of industry. When the great Wool Guild was organized and split up into its two

[1] R. Davidsohn, *Geschichte von Florenz*, i, p. 784.

constituent sections the dyers were grouped amongst the *membra minora*.

In spite of this relegation to the second group of crafts the dyers appear to have held a good position among the cloth-workers, doubtless because their art required considerable skill and because its members were able to provide their own equipment, including dyes, mordants, cauldrons, vats, and other vessels.[1]

This company of dyers associated with the Wool Guild organized themselves into three sections:

A. Dyers with woad (*tintori di guado*).

B. Dyers with madder and other red dyes (*tintori d'arte maggiore*).

C. Dyers with loto (*tintori d'arte minore*).[1]

The woad dyers took the first rank, and were paid the highest wages. They were also employed by the Wool Guild as their agents when large contracts for the purchase of woad had to be negotiated.

The dyers with loto, on the other hand, held the lowest rank, their output being less valuable than that of the other two groups of dyers and wholly unsuitable for exportation. The loto dye was probably derived from the common plant known as the bird's foot trefoil, *Lotus corniculatus*, whose leaves on being dried turn blue and probably contain some substance allied to indigo.[2] This plant, like the Indigoferas, belongs to the *Leguminosae*, and produced a green or clay-coloured dye.

The woad dyers were subject to strict regulations

[1] A. Doren, *Florentiner Wollentuchindustrie*, 1901, pp. 311, 506. These three sections were not at first strictly differentiated, but in 1486 an ordinance was passed that no dyer might belong to more than one section. In France dyers were also divided into three classes (Ch. vii, p. 12).

[2] A. Pratt, *Flowering Plants of Great Britain*, 1889, i, p. 193.

made by the Wool Guild.[1] For example, one regulation, made in 1334, was to the effect that no woad might be mixed with madder or any other red dye. Another regulation of 1367 was that all wool to be dyed in woad must first be examined by inspectors 'stimatores defectuum lanarum', so as to ensure that its quality was satisfactory. Further, a regulation of 1370 laid down that all wool dyed with woad must be examined by the inspectors within fourteen days of the completion of the dyeing operations.

Night work was, generally speaking, prohibited not from any solicitude for the health of the workmen but lest the quality of the output be depreciated. Every effort was made to maintain the highest possible standard in all the productions of the guild. Doren states that it was due to these and other regulations and to strict supervision that the woollen and silk fabrics dyed in Florence over five centuries ago and exhibited in Museums still retain their indestructible brilliance and warmth.[2]

Dyers were forbidden to migrate from Florence to another town lest they divulge the secret Florentine processes. Moreover, every effort was made to secure their return by cancelling the penalty they had incurred. Thus in 1436 a woad dyer was mulcted in the enormous fine of £200 for removing to Siena, where he gave lessons in the dyeing art. The offer was made to him that the fine would be remitted, provided that he returned home by a definite date, and submitted himself to the decision of the consul.

[1] The Florentine dye-works were situated in the part of the city north of the Ponte alle Grazie, near to what is known as the Corso dei Tintori.
[2] A. Doren, *Florentiner Wollentuchindustrie*, 1901, pp. 81, 83.

D. THE WOAD HALL

The woad industry at Florence had as its headquarters an imposing building known as the woad hall, 'fondacus guadi', situated in the neighbourhood of San Peiro Scheraggio, near the Palazzo Vecchio.[1] This establishment was mainly intended for the storage of woad, although two other raw materials required by dyers, viz. madder and potash, were also admitted. Every woad merchant was obliged to store his dye in this hall; otherwise he paid a small fine to the Wool Guild. There were also at one time four large subsidiary woad halls to which supplies of dye could be transferred from the central hall for the convenience of gildani living in the outskirts of the city. After 1338, however, all storage of woad seems to have been concentrated in the central institution.

The number of officials associated with the woad hall testifies to the extensive business transacted in it. Even the earliest statute of the Wool Guild, dating from 1317, refers to these officials. Amongst them were two inspectors, whose duty was to forbid the sale of badly dyed cloths,[2] forty-four licensed brokers,[3] eighteen cloth measurers,[4] four supervisors of the woad hall, and four weighers. To these were added later on twelve

[1] A well-attested tradition states that as early as the 13th century St. Onofrius was regarded as the patron saint of the dyers. The former refectory of the convent of St. Onofrius may still be seen off the *via Guelfa*.

[2] Weavers and dyers were liable to deduction from their wages if their work was in any way defective. (*Die Florentiner Wollentuchindustrie*, 1901, p. 83.)

[3] A. Doren, l.c., p. 365, speaks of eight brokers whose dealings were restricted to woad.

[4] The legal length of Florentine cloth varied from 12 to 14 yards at different periods; its width from $3\frac{1}{8}$ to $3\frac{1}{2}$ yards.

'taratores lanarum', one cloth sealer (for taxation purposes), two rationerii guadi, and eight adjudicators in case of disputes as to the quality and length of cloths.[1] There was also a money-changer.

Detailed regulations prescribed the procedure when woad had to be assayed, and when different qualities had to be mixed so as to arrive at a fair average price; such mixing might only take place in the presence of an expert dyer appointed for the purpose by the consul. A cloth manufacturer might temporarily deposit woad in the hall, if it was for immediate use in his own business; in this case he paid 2*s*. per salma.[2] If, however, his woad was for sale he was compelled to store in the woad hall, which was equipped with all the necessary officials, including the superintendents, brokers, assayors, porters, and weighers. These officials were under the control of the consul of the guild.

The charges made in early days for storing woad were found to be insufficient for the maintenance of the woad hall. In 1350 therefore they were considerably raised, the cost henceforward being fixed at 3*s*. for every sack of woad or for every 1,000 lb. of madder or potash.

The next few years, especially those following the great Ciompi strike of 1378, were amongst the most prosperous ever enjoyed by the Wool Guild; so active was business that the premises of the woad hall no longer sufficed for their purpose. Accordingly, in 1386 the guild acquired a plot of land on the Arno between the Ponte Vecchio and the Ponte alle Grazie, near to the Castello Altofonte, and on it erected a block of industrial

[1] A. Doren, *Das Florentiner Zunftwesen*, 1908, pp. 262–3. The Calimala Guild also had numerous officials, some of whom supervised the dyeing of the cloths they dressed and exported.

[2] A measure of capacity.

buildings, of which the woad hall was the principal one, while a fulling-mill (tiratoio) and a wool-scouring mill (purgatorio) formed subsidiary structures. In 1388, even before the new woad hall was finished, a fresh set of ordinances for its government was drawn up. The officials henceforth no longer held appointments for life, but only for a period of six months. The high caution money of 1,000 florins required in relation to the two superintendents of the woad hall (gubernatores fandaci) shows the heavy responsibilities resting on their shoulders, while their salary was fixed at five florins a month, a higher remuneration than that paid to most other guild officials.[1] Every month they had to account for all receipts to the treasurer of the guild, and submit a stock book, giving both the quantities of dyes stored in the woad hall, and a register of the owners of the said dyes. From 1474 onwards every parcel of woad had to be provided with a special number.

The commission levied on the sale of 1,000 lb. of woad amounted to 23*s.* 6*d.*, while 8*s.* 6*d.* was charged on a similar weight of potash.

E. THE RELATIONS BETWEEN THE WOOL GUILD AND THE WOAD DYERS

The relations which existed between the *membra majora* or wealthy members of the famous Wool Guild and the woad dyers who belonged to the *membra minora* form an extraordinarily interesting chapter in industrial history.[2] The story is one of almost uninterrupted

[1] This low salary was supplemented by fees received in the course of their duties. (A. Doren, *Das Florentiner Zunftwesen*, 1908, p. 379.)

[2] This section is largely based on A. Doren, *Entwicklung der Florentiner Zünfte*, 1897, pp. 75 f.; and *Florentiner Wollentuchindustrie*, 1901, pp. 286 f., where many further details will be found. Cf. also E. Dixon,

domestic quarrels, each of the contending parties in turn enjoying a temporary success.

In early days the dyeing industry was carried on by a body of independent craftsmen who purchased the woad and other dyes they required, set their own vats, and disposed of the wool or fabrics which they had dyed. In course of time, however, these skilful artisans became absorbed, like many other craftsmen, into the huge Wool Guild, under whose orders they had henceforth to serve, by which their standard of life was grievously depressed, and with whose chief officials they had to fight for any improvement in their wages. Yet all the time these dyers were themselves members of the guild, ranking in the second class and deprived of any effective share in its control.

We will deal in order with:

I. Oppression of the Dyers.
II. Efforts for Emancipation.
III. A Short-lived Triumph.
IV. The Ciompi Revolt.
V. Failure of the Revolt.
VI. Decline of the Calimala and Wool Guilds.

I. *Oppression of the Dyers*

In order to understand the situation it must be remembered that the Wool Guild was not composed of only one craft but was an agglomeration of several crafts or companies, ranging from scourers and carders of rough wool to skilled dyers of costly fabrics, amongst whom the woad dyers held the highest rank. These craftsmen were bonded together as constituting the

'The Florentine Wool Trades in the Middle Ages', *Trans. of the Royal Hist. Soc.*, xii (1898), pp. 151–80.

membra minora of the guild, although the dyers were often dealt with apart from the others owing to the specially technical nature of their craft.

The ordinary craft-guilds of the Middle Ages existed for the mutual aid and protection of the members, who were treated as of equal status. In the case of the Wool Guild of Florence, however, the ruling class, or *membra majora*, treated the *membra minora* as subordinates, *suppositi*, and imposed on them intolerable conditions. In spite of their skilled craft, the dyers' wages were reduced wellnigh to those of the inferior employees who worked under them.

Although the guild recognized the highly technical work of the dyers and knew that they could not be replaced out of the residuum of labour in the event of a strike, yet the guild deliberately adopted the policy of reducing the wages paid both to its *membra minora* and to the lower groups of its employees as low as could safely be done. Even the variations in the cost of living between summer and winter, as well as the difference in the length of working hours at changing periods of the year, were taken into account in adjusting the wages, which were invariably based on piece-work.

Further, the three grades of dyes, viz. those in woad, those in madder and other red dyes, and those in loto, were remunerated on a different scale. Even within these three grades there were slight divergences in wages according to the shades of colour with which fabrics were dyed.

The Wool Guild also adopted other means of keeping its pay-sheets as low as possible. One of these was the establishment of its own dye-works, in which every dyer bound himself to accept the low tariff of remunera-

tion. Not only were the wages paid in these works very poor, but the dyers were subjected to vexatious supervision, every little blemish in their dyed work, even small spots, being punished by a deduction from wages.[1] These irritating regulations added to the low wages converted the dyers' task into a form of sweated labour, so much so that these highly efficient artisans were reduced to wellnigh as helpless a position as even the lowest employees, who were mainly day labourers without any privileges or organic attachment to the guild.

II. *Efforts for Emancipation*

From time to time attempts at emancipation from their state of economic servitude were made by the dyers, who were encouraged in their efforts by their financial resources, by the admitted inability of the guild to replace them, and by the claims of their superior craftsmanship. In the two hostile camps were entrenched on the one hand the wealthy *membra majora* of the guild, who were the employers who held all the reins of power in their hands. In the other camp were the dyers without either organization or corporate cohesion, although at the same time they were members of the guild.

Apart from the sources of strength mentioned above, the dyers were encouraged in their agitation for emancipation by a venerable religious fraternity probably dedicated to St. Onofrius as its patron saint, which seems to date back to the 13th century, and which had acquired a sufficient solidarity to weather some earlier

[1] At the time the dyers on admission to the guild had to deposit 300 florins as security, and fines were deducted from this sum whenever dyed fabrics were soiled, badly coloured, or of defective length. (P. Villari, *Two First Centuries of Florentine History*, 1894, i, p. 320.)

disturbances both in the political and industrial atmosphere.

This religious fraternity, although not a guild, exerted a beneficial social and religious influence, enjoyed much prestige, and became the earliest political union of oppressed workers. It possessed a well-defined object, viz. the amelioration of the economic conditions of the working classes. But the religious basis of the fraternity was never disturbed, even during the bitter conflicts which lay ahead and in which the fraternity took part during the 14th century. It seems to have assisted mainly by inculcating lofty ethical ideals.[1]

Another circumstance gave material aid to the dyers, viz. the fact that they had always enjoyed some small share in the government of the guild, and this raised them above the lowest category of employed workers who had no part in the control of the guild. Even the earliest ordinance of the Wool Guild had granted them certain strictly limited rights. Thus their names were enrolled amongst the members of the guild, although only amongst the *membra minora*; they also contributed to the guild treasury, and were entitled to fill some of the lower offices, a privilege which afforded them some experience in administration.

It was doubtless in virtue of these special advantages that the dyers, amongst whom the woad dyers ranked highest, were the first to take action in the struggle for higher wages. They had the clearest ideas of the goal at which they were aiming, and they also achieved the most lasting results, although even these proved

[1] Moreover the fraternity was not confined to wool dyers, but also included dyers of every description, such as silk dyers and dyers of imported cloths (i.e. the Calimala Guild), who were not members of the Wool Guild.

ephemeral. They were further acquainted with and used almost every weapon which in modern times has been resorted to in conflicts between capital and labour.

The dyers made their first effort towards emancipation in 1342 by a petition addressed to the Duke of Athens, who was at that time in military command of Florence and also possessed jurisdiction in domestic affairs. In this petition the dyers complained of their subjection to the *membra majora* of the Wool Guild and of their oppression by unjust ordinances which had reduced them to poverty. A special grievance was that they only received their wages every four or five years, and then only when it suited their employers. Moreover, their grievances could only be laid before the tribunal of the Guild, whose superior members were at the same time their employers and their judges. Although they were actually matriculated members of the guild, their grievances were so serious that speedy remedies were essential to prevent their utter ruin. They begged, therefore, to be released from the intolerable yoke of the Wool Guild, to be enabled to take their due share in the civic life of the town, and to be granted a guild of their own, with the same rights and privileges and duties as were enjoyed by the political guilds.[1]

III. *A Short-lived Triumph*

As a result of this petition the dyers and their associated *membra minora* belonging to the Wool Guild were in 1343 granted a guild of their own with three consuls, and were liberated from the jurisdiction of any other guild.

[1] A. Doren discusses the struggle for liberty in detail. Cf. *Entwicklung der Florentiner Zünfte*, 1897, p. 79 (Schmoller, *Forschungen*, xv).

This great triumph, however, was but short-lived, for in the following year the recently granted Dyers' Guild was again abolished, while the dyers had once again become reduced to a complete dependency on the Wool Guild. The consuls in an overbearing ordinance actually declared that every worker who was connected with any branch of the wool industry must submit to the jurisdiction of the Wool Guild and abstain from every independent activity. Indeed in order to ensure obedience to their orders the consuls invoked the assistance of the civic authorities against any malcontent wool workers.

Nevertheless in spite of their reverse the dyers had gained something from their first effort after emancipation. The *membra majora* of the guild had learned to know and respect the strength of the hostile combination that had been formed against them, and had made some slight attempt to meet the wishes of the dyers. Even as early as 1344 an extra consul had been appointed for the Wool Guild, making nine in all, while in 1348 a dyer was actually appointed consul. Further, a new statute, passed in 1361, ordained that the dyers in woad and other dyes were to be enrolled amongst the *membra majora*, and this gave them the opportunity of filling any office in the guild including that of consul.[1] This gave them a better status than that of the other groups belonging to the *membra minora*.

Although, therefore, the effort of 1343 to secure emancipation failed to achieve its chief objects, it certainly brought some amelioration in the status of the dyers.

Before long, however, fresh symptoms of unrest

[1] The election of consuls was by a curious form of scrutiny which was carried out partly by selection and partly by ballot.

appeared amongst the dyers. Although there was no longer the same arbitrary control by the wealthy wool merchants as before, there was still an irksome control by the consuls, so that the economic position had not gained much from the events of 1343. In 1370, therefore, another attempt was made by means of a well-organized strike to secure improved conditions. To this the cloth merchants at the head of the guild replied by declaring a ten years' lock-out for all employees who did not return to work within a specified time. This strike, however, did not result in any amelioration of the economic conditions which gave it birth, and it soon collapsed. It must be looked upon as the preliminary mutterings of the approaching tempest of 1378.

IV. *The Ciompi Revolt*

The famous Ciompi revolt of 1378[1] has been attributed to many causes. In part it was no doubt a political movement directed against the Guelfs, whose leader was the gonfalier of justice named Salvestro de' Medici, a patriotic citizen whose efforts to mitigate the severity of existing laws were unfortunately rejected. This rejection, combined with a generally oppressive government, provoked a tumult which rapidly developed into a general insurrection in which many of the guilds were induced to take part. Amongst them were the *membra minora* of the Wool Guild, who were still murmuring at the overbearing control of the commercial grandees, i.e. the *membra majora* at the head of the guild, although admittedly some grievances had been remedied. Another dissatisfied class was composed of an inferior grade of citizens, mainly day labourers, who as the employees of

[1] So called because it was led by a wool-carder (*ciompo*).

the guild were in some measure attached to it. Yet they had never been incorporated in the guild and therefore remained unprivileged. Thus various dissatisfied classes joined in the insurrectionary movement which was directed both against the authorities of the city and against the consuls and other high officials of the guilds. One of the chief leaders of the strike was a Michel di Lando, who proved a very capable leader.

For a time the rioters actually gained control of the city and attempted to establish themselves as an independent party on an equality with the existing guilds. They also demanded the formation of three new guilds for the classes that had hitherto been dependent. One of these was called the Ciompi Guild or 'Guild of Woolcombers', and in its establishment the *membra minora*, or subordinate members in the Wool Guild, took a leading part. The other two new guilds included many of the lower artisans who had worked for various guilds, but now detached themselves from them in order to join the new guilds.

These loosely aggregated elements, however, lacked cohesion or stability, and their guild organizations had been hastily constituted, without any regard to means of livelihood or to other economic matters. No wonder, therefore, that before long the revolutionary elements split asunder, rebelled against their own leaders, and dissolved the Ciompi Guild they had just formed. Those who had previously belonged to the Wool Guild returned to it.

The remaining two new guilds, however, after the close of the strike, continued in existence for a longer period, and were added to the twenty-one existing guilds. They had cut themselves adrift from the great

mass of the inferior workers and thus escaped sharing the same fate. Their members were to be free from all subjection to any other guild, and were also allotted some political privileges and a certain number of consuls; but they were not allowed to admit any of the lowest employees into their ranks.

One of these new guilds was called the Guild of Farsettai or Jersey Manufacturers, to whom six consuls were allotted. The other was called the Dyers' Guild, although it also included various other groups of craftsmen. To this were assigned no less than twelve consuls, i.e. four for the dyers, three for the soap merchants and wool-carders, two for the wool-combers, and one each for the wool-tenters and cloth-repairers, for the silk-weavers and for the wool-scourers.

The new Dyers' Guild was quick to take advantage of its additional political liberties, and soon proved the value of a strong organization in the fight with the Lana or Wool Guild for fair labour conditions. Now for the first time, apart from the short-lived triumph of 1343, was constituted a body of organized labour, and one in which the younger men had the larger share of power, as compared with the other guilds which were controlled by the senior members. On various occasions indeed an ordinary labourer was nominated to the office of consul in the new Dyers' Guild. The principal gain, however, in the wage struggle was the attainment of complete independence. Those who formerly had met as employees and employers, both equally important factors in productive operations, now met face to face not as mere individuals but as organized bodies. Moreover, the former one-sided and arbitrary decisions of the employers were now replaced by the judicial decisions

of the civic authorities. The maximum wages so often alluded to in the earlier ordinances of the Wool Guild were now replaced by a minimum wage which was binding on every member of the Dyers' Guild.

V. *Failure of the Revolt*

This, however, was the last success of the revolutionary movement. Before long the play of economic forces, the mediaeval outlook on commerce, the indispensability of capitalist control of the labour market—all these conditions acting in combination forced the members of the new Dyers' Guild back into their old dependent positions in the Wool Guild. Had not this reversion to earlier methods taken place, the ascendancy of Florence in the world markets would probably have disappeared. Within the labour party itself much dissatisfaction still reigned; their own leaders were disobeyed; conspiracies broke out amongst the members of the Wool Guild who had been banished in 1378—all these factors indicated that times were not yet ripe for democratic government.

The wealthy merchant class soon recognized that the common people could not yet dispense with the experience in government which the merchants possessed. Thus in 1382, after a fresh conspiracy which was suppressed by armed forces, the upper classes decided to introduce a new form of government, and in this matter also the Wool Guild took the leading place. This guild, however, was wise enough not to push too far the advantage it had gained, but made some moderate concessions so as to meet some of the demands made in 1378. One of these concessions was the granting of leave to the banished citizens to return to Florence.

Further, the two surviving guilds of those established in 1378 were dissolved, their members being distributed amongst the bodies to which they had belonged before the Ciompi strike. Moreover, the authorities decided that two consuls should be selected from amongst the highly skilled craftsmen who had now been again placed under the authority of the guilds. This virtually conceded one of the chief points for which they had been striving. But the Wool Guild went further than this. The consuls of the guild announced that a third register of members was to be compiled, in addition to the two that had previously been in existence, and that this new register should include both those inferior artificers who had hitherto possessed no defined status and also the apprentices of the Wool Guild, and that both these classes should henceforth enjoy the privilege of becoming actual members of the guild. Further, all persons who had worked for the guild for five years were to be allowed, on payment of £11 10*s*. as admission fee, to become 'veri lanifices et artifices', and to be placed on the first register of members; in fact they were promoted to the class of *membra majora* or employers. Thus the gap between capital and labour was to be bridged over. Six months later yet another concession was granted, and employees who were enrolled in the second register of members (which included the dyers and those on the same level with them), who already had been assigned two consuls, were now granted ten seats on the council of the guild.[1]

The lower employees of the guild had unquestionably

[1] The entrance fees varied with the grade of the new members. The dyers in woad or madder and those *artis majoris* and fullers (?saponarii) paid £12.

won a great triumph over the rich upper class or *membra majora*, but the victory was not for long. The workers who had been suddenly raised to entirely new positions were not equal to their fresh responsibilities. The elevation within a short period of time from the position of an oppressed employee to that of employer was a tremendous upheaval in the ancient traditions of the guild.

In the days of primitive domestic industries, when an artisan might one day be a servant and the next day a master, such a tremendous jump might be possible. Now with the changed economics of production, with the necessity for increased concentration of capital, the jump was too great to be successful. Some of the proposed changes were never actually put into force, and gradually passed into oblivion.

How indeed is it possible to conceive of a common artisan whose wages had been left to the mercy of individual bargaining, and whose combination with his mates had been entirely forbidden, permanently securing for himself high wages or improved conditions of work? How could he possibly save enough in five years to pay high admission fees and become a member of the employing or capitalist class? Where should he obtain credit, learn the conditions of world markets, and gain the experience required to manage a large wholesale business? Even the suggested compilation of the third register of members seems never to have been completed, nor is there an example on record in the annals of Florence of a workman becoming a capitalist.

The second group, which included the highly skilled craftsmen, did not for long enjoy the new dignity which had been conferred on them in 1382. Only a few years later, i.e. in 1393, with the advent to power of Maso degli

Albizzi, more aristocratic principles were again introduced into the government of the Florentine republic, and with this new development was associated the discovery of a fresh conspiracy aiming at a restoration of the twenty-four guilds as they had been established at the time of the great revolt of 1382. These circumstances proved strong enough to throw back the dyers into their former status, on the plea that it was desirable to revert to the institutions as they existed before 1378. A commission of four members was appointed by the guild with power to make the necessary changes, and as a result the consuls disappeared from the list of the officers of the guild. Complaints of low wages and unfair treatment now began to be heard; and although the dyers were still regarded as amongst the *membra* of the guild, and were assessed as such, and a few of them paid the high entrance fees, yet they appear to have lost the special privileges they had so recently acquired and to have been again treated much as before, i.e. as *suppositi* of the guild. In brief the beneficial results of the Ciompi revolt had one by one melted away, and had left behind a chronic state of industrial chaos and unrest. Capitalism had triumphed.

VI. *Decline of the Calimala and Wool Guilds*

Meanwhile during the whole of the 14th and a large part of the 15th centuries the two great Calimala and Wool Guilds continued to progress, and enjoyed unrivalled prosperity in the markets of Europe. There were, however, two obstacles in the path of further development. One was the difficulty which the Wool Guild experienced of obtaining a sufficiency of fine wool out of which to manufacture the cloth for which they had become

so famous. The second difficulty was that the Calimala Guild could no longer import a sufficiency of the rough undressed cloths which it had for so many years been converting into well-carded, well-sheared, and beautiful fabrics which sold at high prices in every civilized country.

In the hope of overcoming these two obstacles the Florentines adopted the following policy, and decided to retain all the finer and more lucrative processes of cloth-dressing and cloth-dyeing at home, and to establish workshops in other countries such as Flanders, Holland, France, and England, where the best wool could be found, and where the preliminary processes in the manufacture of fine cloths could be carried out. These half-finished cloths were then brought back to Florence in order to undergo the final processes.

This policy, however, at first sight so ingenious, in the long run proved disastrous; by adopting it the Florentine Wool Guilds dug their own graves. Before many years had elapsed factories began to spring up in various northern countries in which foreigners were carrying on the identical processes of which Florence had hitherto possessed the monopoly. Further, the northern nations began to check the exportation both of their fine wools and of their undressed cloths, even England under Henry VII taking steps in this direction.

Thus the raw materials on which the Wool and the Calimala Guilds had depended as the source of their wealth were gradually filched away, these great Guilds were ousted from their former markets, and a serious decline in the wool industry stared them in the face. Happily the silk trade had to some extent come to replace the commerce in wool. The *Arti* were finally abolished in 1770.

CHAPTER X

THE TRADE-ROUTES OF WOAD

IN the Middle Ages ships laden with woad and other commodities navigated the Mediterranean and Adriatic Seas, as well as the Eastern Atlantic, the North and the Baltic Seas. Thus woad played a part in the exchange of commodities between different countries, and contributed to human happiness and welfare. A study of the trade-routes of woad will give some idea of the extent of the woad trade.

There was a period of insecurity for life and limb, as well as for property during the Middle Ages. Robbers and pirates rendered transport over land and sea dangerous and costly, and added to this insecurity was the inadequacy of harbours, the absence of reliable maps and charts, and the dependence of shipping on propitious weather conditions. It may be recalled here that as late as the time of Napoleon, the invasion of England was delayed and subsequently abandoned owing to contrary winds, and that the love-letters from Nelson to Lady Hamilton were often much delayed by the same cause.

Some of the risks to which the merchant trading oversea was exposed are thus graphically described in Shakespeare's *Merchant of Venice*:

> Have all his ventures fail'd? What, not one hit?
> From Tripolis, from Mexico and England,
> From Lisbon, Barbary and India?
> And not one vessel 'scape the dreadful touch
> Of merchant-marring rocks? Act III, Sc. 2.

Earlier chapters have given evidence of the large

proportions attained by the trade in woad, and its geographical extension demonstrates the imperious demand for this dye—a demand powerful enough to overcome the natural and artificial barriers against foreign imports due to prejudice and ignorance.

In the following pages the geographical distribution of the woad trade is briefly described. The distribution is arranged under the headings of important entrepôts and woad districts, and an attempt is made to correlate areas of production and consumption.

The following are the principal headings:

A. VENICE AND GENOA.
B. BORDEAUX.
C. JÜLICH AND THÜRINGIA.
D. ENGLAND.
E. MAP OF THE TRADE-ROUTES.

A. VENICE AND GENOA

The principal trade-route for all Europe was that from Venice, *via* Genoa and Narbonne, after which the ships called at Bordeaux and sailed thence to the southern shores of the British Isles, to the Low Countries, and to all the ports of north-west Europe. Venice and Genoa were not only the ports in which the trade of the Levant and the Far East was centred, but were also the head-quarters of the greatest maritime carriers. Venetian and Genoese galleys occupied much the same position in the organization of trade as the British fleets of tramp steamers do to-day. Their cargoes included the merchandise of the East, Malmsey and other French wines, wool and cloth, woad and other commodities. Until the Navigation Acts of Henry VII, these galleys extensively used the port of Southampton discharging

wines, spices, and woad, and taking in exchange English cloth and wool.

So valuable was the trade between Genoa and Southampton that a Genoese merchant in 1379 actually proposed to make Southampton the staple for all kinds of oriental goods that had hitherto been shipped to Flanders, Normandy, and Brittany. Desirable as this arrangement would appear to be, the project was not favourably received and the Genoese merchant was assassinated. There is abundant evidence that many Genoese ships in the 14th century imported large quantities of woad into Southampton in addition to other merchandise.[1]

In Hakluyt's *Libelle of Englyshe Polycye*, 1436, there appears the following interesting passage referring to the woad trade between Genoa and England:

> The Janueys (Genoese) comyne in sondry wyses
> Into this londe wyth dyverse marchaundyses
> In grete Karrekkis (carracks) arrayde wythouten lake (lack)
> Wyth clothes of golde; silke and pepir (pepper) blacke
> They bringe wyth hem (them) and of woad grete plante,
> Woll-oyle (wool-oil), wood-aschen by vessell in the see,
> Coton, roche-alum and golde of Jene (Genoa).
> And they be charged with woll ageyne, I wene,
> And wollene clothe of owres (ours) of colours all.[2]

The English ports were not by any means the only

[1] G. Schanz, *Englische Handelspolitik*, i, pp. 114–15. At one time almost the whole export of the Toulouse woad was in Genoese hands.

[2] G. F. Warner, *The Libelle of Englyshe Polycye*, 1926, p. 18. Cf. also Hakluyt, *Principal Navigations of the English Nation* (Everyman's Library), i, p. 183. The wool-oil here referred to was probably olive oil used in cloth manufacture. Wood-ashes were used in dyeing with woad. The rock-alum was obtained from the alum-stone found in Italy and used for the 'draping of woollen clothes'. Hakluyt goes on to say that the Genoese sometimes carried their goods on to Flanders, doubtless to Bruges, the chief staple of their trade.

ones used by the Genoese ships; they called at all the important places along the coasts of Normandy, Brittany, and Flanders. On one occasion a Catalan ship bound from Genoa to Sluys (the port of Bruges) was wrecked at Dunster with 172 bales of 'wadde' on board.[1] Genoa exported the famous Toulouse woad, in addition to the woad of Piedmont. The excellent Toulouse woad always found a ready market in England, as well as in continental towns such as Sluys.[2]

B. BORDEAUX

Bordeaux ranked first amongst the ports that owed their prosperity to the commerce in woad, and as early as the 12th century a flourishing entrepôt for the export of the dye existed at this port. In the early Middle Ages, Bordeaux was actively trading in woad destined for the Flemish weavers, who were famous for their cloth long before their English rivals. The main ports of entry were Sluys and Antwerp; to the latter port supplies of both wool and woad were also exported from England.[3]

Bordeaux was also a centre for the coastal trade to the neighbouring towns of Marans, Nantes,[4] and Redon.[5]

[1] Macpherson, *Annals of Commerce*, 1805, i, p. 590; cf. also Warner, l.c., p. 18.

[2] G. Schanz, l.c., p. 115.

[3] F. Michel, *Histoire du Commerce à Bordeaux*, 1867, i, p. 296. The extent of the trade between Bordeaux and London is shown by the fact that in 1350 141 ships carrying 13,429 tuns of wine sailed for London. (F. Michel, l.c., i, p. 402.)

[4] Nantes was probably one of the ports through which Brittany exported woad to Southampton. At any rate the Breton woad merchants complained bitterly of the Navigation Acts, which stopped them from 'shipping Gascony wines and Toulouse woad in their own ships'. (G. Schanz, i, p. 296.)

[5] F. Michel, l.c., i, p. 304.

The ships called also at Caen,[1] an important market for the supply of the dye to the merchants of Paris, Rouen, Orleans, Antwerp, and London.

Woad figured extensively in the coastal and cross-channel trade. The Spanish ports of St. Sebastian, Bilbao, Portugalete, and Santander were connected with coastwise trade centred at Bordeaux; Toulouse woad passed through those towns for the inland markets at Pampeluna and Burgos.[2]

The exports of woad from Bordeaux had reached enormous proportions by the end of the 16th century, 200,000 bales being exported annually. A large part of this woad was used in the cloth industries of England [3] and Flanders. This increase was due in a large measure to the English Navigation Acts; as a result of these enactments Bordeaux became a staple for the woad trade and the head-quarters of the French woad industry.[4]

C. JÜLICH AND THÜRINGIA

The woad produced in the Jülich district [5] was transported overland *via* Cologne and by water to the Hanseatic ports; much of it was also supplied to the cloth-manufacturing towns on the lower Rhine.

[1] Caen carried on a brisk cross-channel trade with Sandwich. Cf. Gras, l.c., p. 119.

[2] F. Michel, l.c., i, pp. 302–3. Even Cartagena appears to have been occasionally reached. Spain at this time exported woad—'Wode of Spayne' appearing on the European market. (G. Schanz, l.c., p. 229.) Portugal is less often mentioned in connexion with woad than is Spain, but in 1560 it exported 'Woads' to Antwerp. (D. Macpherson, *Annals of Commerce*, ii, pp. 130–2.)

[3] Bordeaux had considerable trade relations with Hull in the 12th century. (Michel, l.c., i, p. 115.)

[4] Schanz, l.c., i, pp. 303, 369. In 1489 (4 Hen. VII, c. 10) woad was added to wine as a commodity that could only be shipped in English bottoms.

[5] H. Jecht, *Geschichte des Ostdeutschen Waidhandels*, 1923, i, p. 61.

In the 16th century Antwerp became an important woad emporium. In 1560 it received from Germany by land carriage 'woad, madder, and other dyers' wares', and woad from 'Eastland' and Poland. In the same year it imported 'woads' from Portugal, while its imports from France amounted to 40,000 bales of fine Toulouse woad, which at $7\frac{1}{2}$ crowns per bale was worth 300,000 crowns (£75,000).[1]

One of the most productive of all woad districts was that of Thüringia, where the five towns, Erfurt, Gotha, Arnstadt, Langensalza, and Tennstedt, were so famous that they became known as the Waidstädte.[2] This district required several outlets for its produce, and its capital, Erfurt, was admirably situated geographically for the overland distribution of the dye. To the west led the ancient route to Frankfurt, which became a market town for the dye; to the south lay Speyer, another market. Cologne still farther west was in the heart of a textile-manufacturing area and required more woad than was produced in the vicinity. It therefore imported woad from Erfurt, and distributed the surplus to the Netherlands. At times even Antwerp secured supplies from the great producing area in Thüringia.[3]

To the south of Erfurt, Nürnberg became an important woad market. In the 14th century a hundred wagon-loads of woad entered the city yearly, and this number was nearly doubled during the following century.

Erfurt also was on the great highway going east, which crossed the Elbe, to the north of Dresden, and struck across the country (afterwards called the Ober-

[1] D. Macpherson, *Annals of Commerce*, ii, pp. 130–2, 610.
[2] Jecht, l.c., p. 61. [3] Jecht, l.c., p. 10.

lausitz) towards Breslau in Silesia, and eventually opened out into Poland and Galicia. Here was located Görlitz, the centre of a notable cloth industry; in the 13th and 14th centuries many scores of wagons laden with woad entered this important manufacturing town every year.

Thüringian woad was also handled by the ports of the Hanseatic League—Bremen, Rostock, Danzig, and Stralsund.

D. ENGLAND

In the English woad trade, the port selected would, other things being equal, be one of the staple towns. The Statute of the Staple (27 Edw. III) enacted that the staple be held in the following places, viz., for England—Newcastle, York, Lincoln, Norwich, Westminster, Canterbury, Chichester, Winchester, Exeter, and Bristol; for Wales—Carmarthen; for Ireland—Dublin, Waterford, Cork, and Drogheda. The commodities which were declared to be staples and which could only be traded at the ports stated, included wool and woolfells. As woad was at this period indispensable to the production of the better quality of blue cloths, a demand for wool and dealings in that commodity can be taken to indicate a demand for woad.

Large quantities of woad were sent to England by the Hanseatic merchants. These merchants dealt with a variety of goods, and the port to which those goods would be consigned would be selected with a view to the town's proximity to some given industry. Records show that the Hanse merchants favoured the ports of Sandwich, London, Lynn, and Berwick.[1]

[1] N. S. B. Gras, *The Early English Customs System*, pp. 31, 130, 360, 374, 560. The tolls of Portsmouth were included with those of

In Hakluyt's *Libelle of Englyshe Polycye* an indication is given of the cross-channel trade between England and the Netherlands provinces of Brabant and Zeeland.

> The marchaundy of Brabant and Selande
> Be madre (madder) and woade, that dyers take one hande
> To dyen wythe garleke (garlic) and onyons,
> And saltfysche als for husbond (husbandmen) and commons (common people).[1]

The dye was imported into England in the early 13th century through Saint Valery at the mouth of the Somme, from Calais, an English staple port, and also from Crotoy.

E. MAP OF THE TRADE-ROUTES

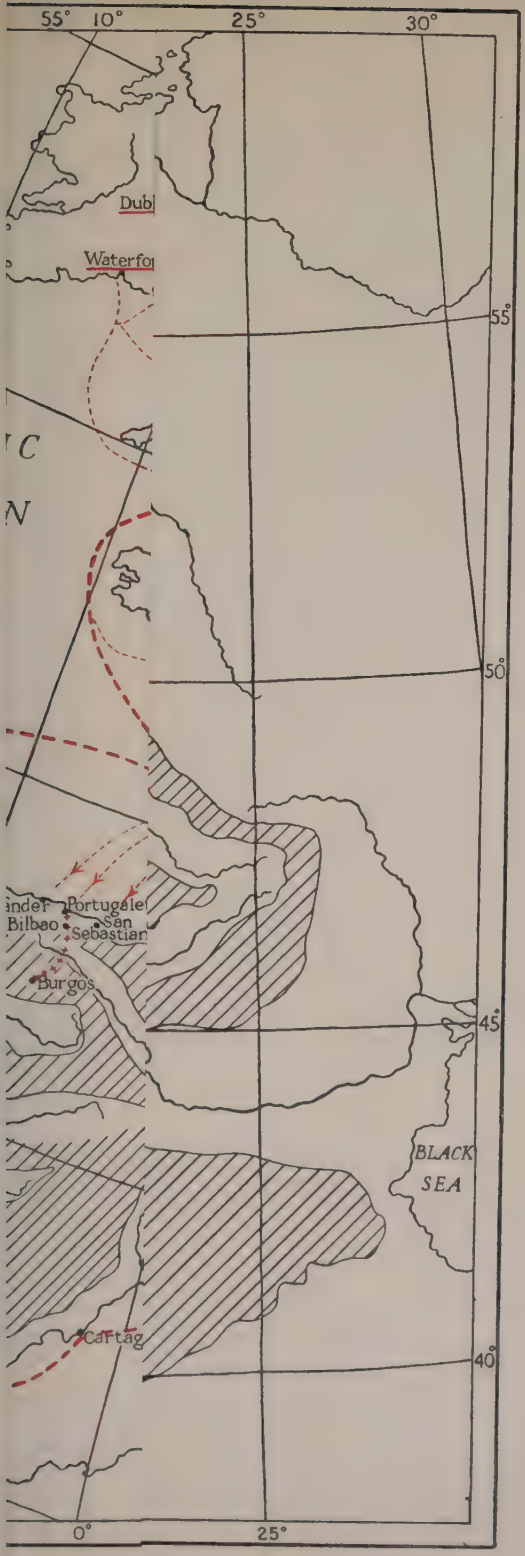
The accompanying map (Fig. 11) will facilitate the visualization of the production and distribution of woad through Europe as a whole; it will also show that the trade was associated with the textile-manufacturing areas.[2] No attempt has been made to indicate every town or port associated with the woad trade, but the more important localities have been inserted.

Southampton and levied by the Mayor of the latter. Danzig was one of the Hanseatic towns which in the 14th century did a large trade with England, especially with London, Hull, York, Lynn, and Boston. Its imports and exports were worth about £400,000 a year. The various volumes of the Hansisches Urkundenbuch contain many references to woad. Cf. Indexes.

G. Schanz (l.c., i, p. 311) supplies evidence of the export of woad from Bristol to Ireland but does not name the port, which was probably Waterford.

[1] G. Warner, *Libelle of Englyshe Polycye*, 1926, p. 28. Cf. also R. Hakluyt, *Principal Navigations of the English Nation* (Everyman's Library), i, p. 188.

[2] H. Hall has published an interesting chapter on 'Ports' as well as a map of trade-routes in the Middle Ages. Cf. *History of the Custom-Revenue in England*, 1885, i, frontispiece; ii, pp. 1 f.


55°
10°
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30°
Dubl
Waterfo
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C
N
50°
Portugalet
Bilbao
San
Sebastian
Burgos
45°
BLACK
SEA
Cartag
40°
0°
25°

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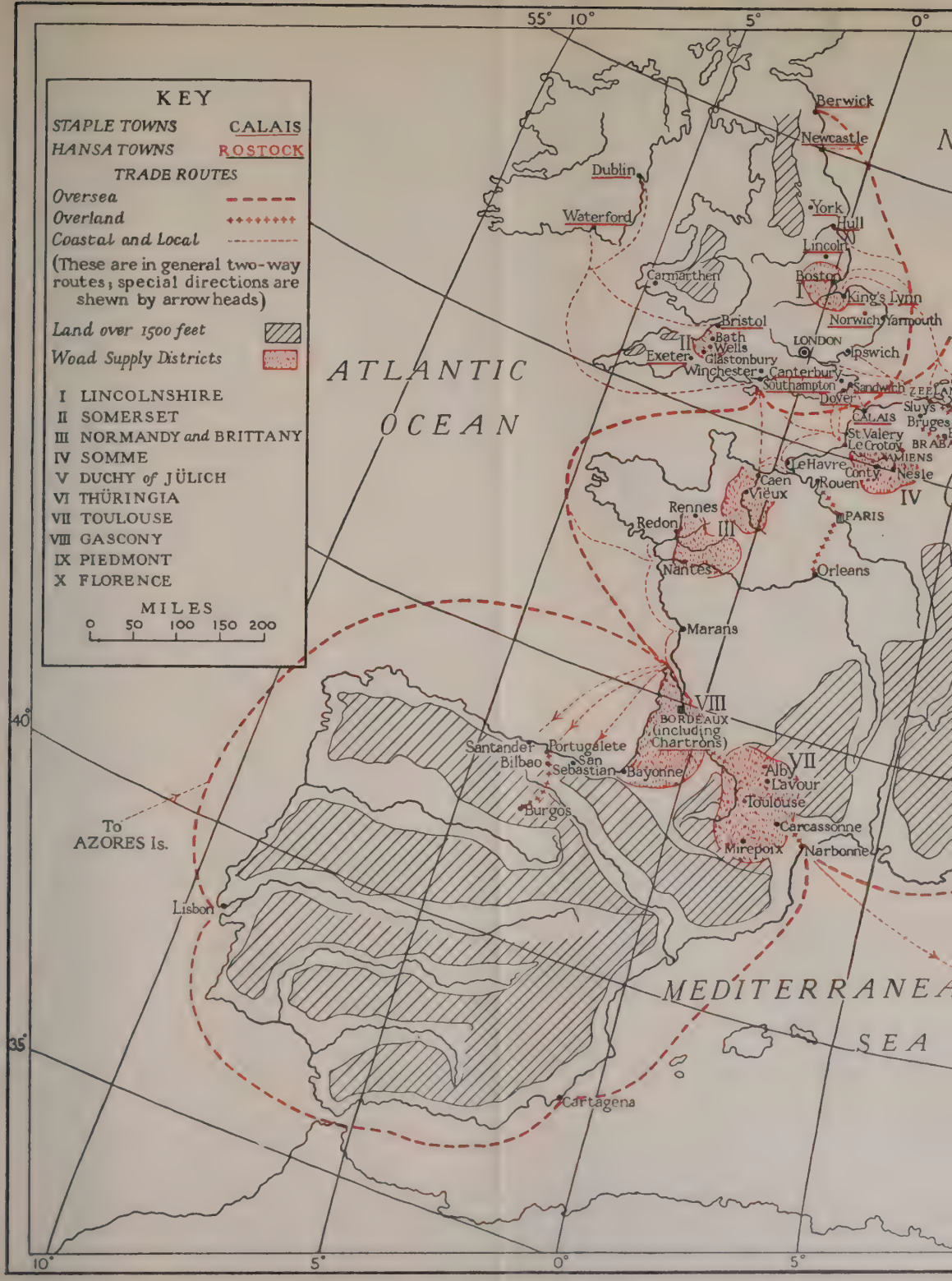

FIG. 11. MAP SHOWING THE TRADE-ROUTES OF WO

AND THE CHIEF DISTRICTS OF PRODUCTION

CHAPTER XI

THE TAXATION OF WOAD IN ENGLAND

THIS subject may be conveniently discussed under the following headings:

A. IMPERFECTION OF EARLY RECORDS.
B. LOCAL AND NATIONAL TAXATION.
C. TAXATION IN THE TWELFTH AND THIRTEENTH CENTURIES.
D. TAXATION IN THE FOURTEENTH CENTURY.
E. TAXATION IN THE FIFTEENTH CENTURY.
F. TAXATION IN THE SIXTEENTH CENTURY.
G. TAXATION IN THE SEVENTEENTH CENTURY.

A. IMPERFECTION OF EARLY RECORDS

Woad was an important commodity from the earliest times until about the end of the 17th century, and the earliest records must therefore be searched for information as to the share it took in the provision of the king's maintenance and revenue. At such an early period it cannot be hoped that the data will be found sufficiently comprehensive and reliable to permit the application of modern statistical analysis. This chapter, however, will give a selection from a large number of early references and tax entries.

For a true evaluation of the following materials the special marks of the Middle Ages—the absence of co-ordination and the lack of a generally accepted terminology—must be borne in mind. Even a cursory examination of tax records will reveal the fact that taxes were both variously named and collected by varying authorities; in part by the authority of the crown and in part

by the authority of the town or commune. In the matter of assessment the commodity fared differently at different places, according to the exactions of the collector by whom the tax had been farmed. To add to these difficulties, weights and measures showed great variations, while the commodity itself was sold in different forms. Lastly, there remains the almost insurmountable difficulty of assessing the value of money at the time of the early records. In this connexion the evolution of a money economy must also be considered. It will then be obvious that in the 12th, 13th, and 14th centuries money as we know it to-day—the universal medium of exchange of a trading civilization—was almost unknown outside the ports. Payments in kind were the rule, and as the king moved from one manor to another, he consumed the commodities due from the holder of the land to his lord; money payments were for the most part confined to the towns, being remitted by the town in return for its privileges and for the commutation of its feudal dues to the king or to his representative. The collection of the king's taxes, such as the duties levied by the Winchester Assize of 1203, were grafted on to this existent money tribute, and collected on the king's behalf by some authority in the town, such as the Chamberlain of London. Not until the 16th century brought the New World under the command of Europe did money and treasure become increasingly important national assets. With this need for national treasure came the beginnings of nationalism, the unified State with unified taxation. Then appeared the rate-book enacting the rates for all commodities, and these old tax records sometimes have a modern ring about them. The numerous woad tax entries that have

been found, and the bequests of the commodity in wills prove that the dye was a highly valued article in the commerce of England and of the Continent.

The more interesting and illustrative extracts have been quoted in this chapter, and arranged chronologically. They are not exhaustive and no attempt has been made to estimate the total amounts of woad imported into England or to gauge the extent of the trade relatively to the rest of our foreign trade. The early records are of necessity fragmentary, and the numerous gaps in those records rob such an estimate of any value. The chronological arrangement has been adopted since early customs-duties can only be classified with difficulty, and classification, while valuable in the consideration of fiscal history, might only obscure the continuity of the references to woad over the period under discussion.

B. LOCAL AND NATIONAL TAXATION

The development of taxation followed the accepted evolution of all social phenomena—from local to national organization. Consequently the records of ports, such as London [1] and Sandwich,[2] are especially interesting.

Local taxes or dues were divisible into two branches: the first were general tolls on bringing goods into or taking goods out of a town; the second were special payments made for services or the use of utilities owned by the town. These dues had no reference to the origin or ultimate destination of the wares and therefore were not connected with exports or imports considered nationally. The other taxes can be grouped under the

[1] *Liber Albus*, ed. by H. T. Riley, 1859, pp. 228, 273.

[2] *Consuetudines et Usus Sandwici*.

headings national and semi-national customs. National customs included the taxes on imports and exports levied under the Ancient Custom of 1275, and the New Custom of 1303, while the semi-national customs were taxes due to the king, but, being collected under local authorities, were modified by local usage; of such taxes were the duties known as lastage and scavage.[1]

C. TAXATION IN THE TWELFTH AND THIRTEENTH CENTURIES

The earliest taxation records of the 12th century that are of value as indications of the importance of woad are the accounts of the Chamberlains of the port of London. Henry de Casteillin,[2] who was the Chamberlain during the seventh and eighth years of the reign of Richard I (1198), accounts, among other items of revenue, for £96 6*s*. 8*d*. paid in fines by merchants for leave to import woad into England and sell it there. Gervase of Aldermanbury,[3] another Chamberlain of London, in his account for the period 'from Whitsontide in the 8th year of king Richard I to the feast of SS. Philipp and James next before the coronation of King John (1198 to 1216) . . . (shows the item) £47 14*s*. 9*d*. the fines of sundry merchants for leave to import and sell woad in England . . . (and) 47 marks arising by the sale of woad that was taken from the king's enemies'. It will be seen that woad could not be imported or exported 'without licence and custom paid in lieu of, or in addition to, a fine'.[4]

The subject of licences will be dealt with later on, but

[1] Cf. *infra*, p. 189, n. 2.
[2] T. Madox, *History of the Exchequer*, 1769, Chap. xviii, §§ 3, 4.
[3] Ibid.
[4] H. R. Hall, *History of the Custom-Revenue*, 1892, ii, pp. 81, 83.

it may be noted here that they were granted concurrently with the imposition of an assize (i.e. duty) on woad.

The foregoing references belong to the period before the Custuma Antiqua, and are examples of semi-national taxes collected locally on behalf of the king.

The Keepers and Wardens of the Sea Ports provided the accounts of taxes levied on overseas trade, and this was a national revenue collected by these special officers of the Crown who had some specified district allotted to them. The following table is taken from the *Compotus Custodum Portuum Maris* for the 15th year of King John's reign (A.D. 1216) for the various duties collected at the different ports or groups of ports.[1] The dye woad provides a conspicuous contribution of nearly £600, and even this sum cannot be taken as the total for the whole country since it is probable that woad came in at other ports, especially as it was not a 'staple' commodity. The practice of grouping ports was common at this time, the staple port generally consisting of a group, the subsidiary towns being called 'members'.[2]

	£	s.	d.
Ports of Kent and Sussex (except Dover)	103	13	3
Ports of Yorkshire	98	13	4
Ports of Lincolnshire	47	3	4
Ports of Norfolk and Suffolk	53	6	0
Port of Southampton	72	1	10
Ports of Essex	4	2	4
Places not named, perhaps including London	214	12	0
	593	12	1

[1] T. Madox, *History of the Exchequer*, 1769, Chap. xviii, §§ 3, 4; D. Macpherson, *Annals of Commerce*, i, pp. 359, 382; W. J. Ashley, *Economic History and Theory*, 1893, ii, p. 243. Ashley's emendations of some details have been adopted.

[2] Cf. Gras, *Early English Customs System*, p. 267. See also p. 192, n. 1.

The items for woad are termed *Assisa Waisdiae* in the *Compotus*.

It would be interesting to know the rate of the 'Assisa' during the six months of 1216 which yielded the sums mentioned in the table. If the rate be considered as the 'fifteenth'[1] of King John, levied under the Assize of Winchester of 1203, it would represent a value of £8,904 1*s*. 3*d*. Owing, however, to the lack of documentary evidence as to the rate, and to the fact that the 'fifteenth' was known to have fallen quickly into disuse[2] and was withdrawn some time between 1207 and 1210, the exact value must remain doubtful.

The Latin expression *Assisa Waisdiae* is most interesting. As no details are known of an assize of woad as a separate ordinance, comparable to the assize of bread and ale, the assize of woad must be regarded as an ordinary tax levied by King John, who was apparently in great need of money.

The term 'assize' should be considered in some detail, as it offers an excellent example of that absence of generally accepted terminology which was remarked above. The word has a long history in constitutional and legal usage.[3] For the present purpose it will be sufficient to note that the term derives from the Old French Assize—'act of sitting down', 'act of settling—settlement', thus a fixing of imposts, assessments, but it is not clear whether the intransitive 'a sitting' or the transitive 'a thing settled' was the original sense. The first meaning is then quite obviously that of a legislative assembly, with the further development of the 'settle-

[1] The 'fifteenth' could easily be converted into a poundage rate and in that case would be equal to 16*d*. per £. Cf. Gras, *Early English Customs System*, p. 80.

[2] Gras, l.c., pp. 50 f.

[3] The *Oxford English Dictionary* gives a fully documented derivation.

ment' in the idea of an edict, e.g. the Assize of Clarendon, the Assize of Bread and Ale, and the Winchester Assize.[1] The last was an emergency war tax to assist John in the struggle with France. In the three assizes given above, the three uses are apparent: the first was a legislative code, the second a settlement of measures and quality, and the third a schedule of taxes. Of the Winchester Assize there is no conclusive evidence to show whether the taxes were paid in kind or specie. There is, however, no sign of an organization of warehouses and sellers; it seems therefore probable that at least the greater part was paid in coin, especially as the tax was collected in the towns and ports where specie payments must have originated. If then the view here advocated is accepted that *Assisa Waisdiae* simply refers to a woad tax, the dye was an important commodity before the Custuma Antiqua, and the repeated items of duty payments found in port returns to the Exchequer indicate clearly that the trade was widespread. This wide extension of the trade and the varying form in which the commodity was sold would seem to make regulation as to measure and quality both desirable and necessary, but it is probable that such regulation was carried out by the Dyers' Guilds.

D. TAXATION IN THE FOURTEENTH CENTURY

The end of the 13th century and the beginning of the 14th provide a good example of the semi-national taxation to which reference has already been made. The dues of lastage and scavage [2] were established by, and

[1] Detailed treatment of this assize can be found in Gras, *Early English Customs System*, pp. 48–52.

[2] The reasons for regarding lastage and scavage as semi-national customs-dues are given by Gras, l.c., pp. 32, 35. Lastage generally

belonged to, the king's government, but were collected locally and modified to harmonize with existing dues levied for the various services rendered by port and market. The following extracts refer to the dues for lastage and scavage at the port of Sandwich, and date from the closing years of the reign of Edward I.

ACCOUNT OF LASTAGE COLLECTED IN THE PORT OF SANDWICH (1299–1300)

Recepta custume de Sandwyco:[1]

pro ix doliis vini	iii s.		
pro iv saccis lane		viii d.	
pro ii balis allute		viii d.	
pro i granario wode		iiii d.	
pro i bala panni		iiii d.	
pro ii saccis lane		iiii d.	

. . . . .

Paricule nove custume recepte apud Sandwicum:

pro iiii saccis et iii clavis lane	xiii s.	vi d.	qr.[2]
pro ii saccis lane	vi s.	viii d.	
pro xx libratis allute wadii et vinorum eductorum	v s.		

It has been stated above that the evolution of taxation passed by stages from a local to a national system, and it was to the existing local tolls that the king's dues were added. The Middle Ages was emphatically a period of lack of organization; trade existed, but was carried on under great difficulties; inland communication was in-

meant a due, at a specific rate on each article, paid by ships leaving port with cargoes. Scavage was a tax levied on goods imported from beyond the seas. (Gras, l.c., pp. 29, 33. Cf. also p. 194.)

[1] Gras, l.c., pp. 31, 203. In these extracts woad (wode, wadii) is twice referred to. In the first one 4*d*. is paid 'pro i granario' and in the second 5*s*. (i.e. 3*d*. per £) is paid for £20 of 'allute, wadii et vinorum eductorum'.

[2] Ibid., l.c., pp. 200, 214. 'qr' stands for 'quadrans' (¾*d*.).

secure, and roads were rudimentary, while sea transport was uncertain and adventurous. Towns and ports as fortified places alone offered adequate protection for the merchant. As a corollary it followed that, under the influence of the feudal system, and necessarily for the provision of facilities for trade and the equipment for loading and unloading, the markets and ports required payment. Here may be found the basis for all local customs and dues. From the nature of the services rendered, no distinction was necessary as to the origin or destination of the merchandise, all comers being required to pay the dues, with the possible exception of perhaps the leading burgesses of the town or port.[1]

At the town of Berwick the following local customs were payable in 1303:[2]

RATES OF LOCAL CUSTOMS—BERWICK

Goods.	*Outwards.*	*Inwards.*
	d.	*d.*
Alum, *carta* . .	4	0
Brazil, 100 lb. . .	2	0
Coals, ton . . .	4	0
Garlic, *summa* . .	½	0
Onions, M. . .	½	0
Wax, wey . . .	8	0
Wine, tun . . .	4	4
Woad, frail . .	35	22

The following examples illustrate the local dues levied by a city such as Winchester in the Middle Ages, and throw a light on the conditions of internal, or domestic, trade:

'Every cart that brings woad for sale fourpence, a horse-load one penny.

[1] Gras, l.c., p. 153.

[2] Ibid., l.c., pp. 130, 166. 'Waida' is a variant of woad.

'Every countryman that brings into the city potash for use with woad owes the king as custom six pence a year and one penny to the clerk for enrolling his name, unless he come not more than once a year.'[1]

In 1303[2] Edward I, who was engaged in a war with Scotland, attempted to raise revenue by a new plan. He made a specious contract with the alien merchants, granting them freedom from irregular taxes in exchange for stated poundage rates on all commodities imported and exported by them. This new custom had a very chequered history and soon lapsed into disuse. In 1311 it was completely abrogated, to be restored in 1332, and has survived into comparatively modern times; the last trace of the custom, the butlerage of wines, disappeared as recently as 1809. It will be sufficient to notice that the duty was an early example of national taxation levied under the prerogative powers of the king, and is important in that it anticipated, and was a model for, many later impositions. The rate was specific for certain commodities, while other wares bore *ad valorem* or poundage rates.

The following are extracts from the Sandwich account:

THE ACCOUNT OF THE NEW CUSTOM ON GOODS SUBJECT TO POUNDAGE, IMPORTED AND EXPORTED BY ALIENS AT THE PORT OF SANDWICH.[3]

Feb. 10th–May 4th, 1303.[4]

[1] J. S. Furley, *Ancient Usages of Winchester*, 1927, pp. 40, 41. Further examples of local customs will be found on p. 193.

[2] Gras, l.c., pp. 69 f.

[3] Sandwich 'port' probably extended along the coast from Sandwich to Winchelsea, thus including Dover and Romney. Sarre was also dealt with under Sandwich. (Gras, l.c., p. 267.)

[4] Gras, l.c., pp. 267–70, 313. Further examples will be found on

The following figures refer to wadium (woad):

pro viii libratis wadii	ii s.
pro xx libratis wadii	v s.
pro lxviii libratis wadii	xvii s.
pro xxx libratis wadii	vii s. vi d.
pro vi^{xx} [120] libratis wadii	xxx s.

in every case the rate of 3*d.* per pound, 20*s.* *ad valorem.*

E. TAXATION IN THE FIFTEENTH CENTURY

Evidence of local taxes and tolls are found in the earliest historical records. Bridge and road tolls still exist to-day.

In the 15th century the Port of Southampton levied tolls on both ingoing and outgoing consignments of woad. The scales given below appear to be the more usual; as must be expected, the rates showed considerable variation.

PORT BOOKS OF SOUTHAMPTON 1428 to 1430 [1]

Customs	per bale	2*d.*
,,	per balet	1*d.*[2]
,,	per saket	½*d.*[3]
,,	per 3 pointels (wolde)	2*d.*[4]
,,	per ton	6*d.*[5]

pp. 319, 325, 334–6, 340–3. Cf. also Index *s.* wadium, weysda, woad. The word 'librata' represents a pound (20*s.*) in value. (Gras, l.c., p. 258.)

[1] P. Studer, *The Port Books of Southampton*, 1913. Cf. Gras, l.c., pp. 174, 196.

[2] A balet was usually half a bale.

[3] A saket or small sack held a quarter of a bale.

[4] Dr. Studer regards wolde as identical with woad. It is, however, more probable that the word refers to weld (*Reseda luteola*), a yellow dye. The weight of a pointel seems to have varied. Another entry states that 24 pointels were equal to four hundred (pounds?).

[5] As the duty levied on a ton was 6*d.* and that on a bale was 2*d.* the ton was probably equal to three bales.

CUSTOMS	per pipe	custom free[1]
„	per quarter	1*d.*[2]
PONTAGE	per bale	¼*d.*
„	per balet	1¼*d.*[3]
CRANAGE	per ton	4*d.*[4]

Hall gives a table of the local customs levied at various ports and cities, including Berwick, Canterbury, Dover, Sandwich, and London. At the latter city woad for export paid ½*d.* a quarter, wheat paid ¼*d.* for two quarters, 1,000 herrings exported by *aliens* paid ¼*d.*, and so on.[5]

Reference has already been made to the semi-national tax known as scavage. An example dating from the 15th century shows a list of duties collected probably in the port of London. It will be noticed that the commodity was imported, being followed by the abbreviation 'ven', which stood for 'venientis', i. e. 'coming'.

De quolibet dolio wysdae (woad) ven.	xii*d.*
De qualibet bale de wisdae (woad) ven.	ii*d.*[6]

From very early times the kings of England were forced to obtain special grants for the emergencies of national defence. As far back as 1266 these special grants are found under the names *auxilium* or *subsidium*.[7] In general the distinction is based on the origin of the

[1] These figures were taken from Studer, l.c., pp. 43, 51 (saket), 100 (pointel), 89 (ton), 97 (pipe), 80 (pontage of bale and balet), 89 (cranage). A pipe equals a cask.

[2] P. Studer, *The Oak Book of Southampton*, 1911, ii, p. 11; Index Supp. 3.

[3] Ibid., l.c., p. 80. These figures illustrate the anomalies in the charges levied for pontage, which was a toll for the repair of bridges.

[4] Cranage was a toll levied for the use of the town crane.

[5] Hall, ii, pp. 164–6.

[6] Gras, l.c., pp. 212 f.

[7] Ibid., l.c., pp. 78 f., 515.

tax, the *subsidium* being granted to the king by the authority of the nobles or later by parliament for a limited period. The rate was always specific on certain commodities such as wool, but a later example will be quoted in the section dealing with the 17th century, in which the subsidy of poundage on all commodities was duly listed in a schedule or book of rates attached to the enactment.

Interesting details are extant of the subsidy granted on all goods with the exception of wool, woolfels, and hides. The accounts showed the owner of the ships and also the name and domicile of the consignee. Below will be found extracts from the Lynn account for 1466 to 1467. The total value of the consignment is given with the amount of subsidy paid; the value of each item is also given so that it is possible to calculate the subsidy payable, which will be found to be at the rate of 1*s.* in the £.

AN ACCOUNT OF THE SUBSIDY ON ALL GOODS, EXCEPT WOOL, WOOLFELS AND HIDES, EXPORTED OR IMPORTED BY DENIZENS AND HANSEATIC MERCHANTS OR OTHER ALIENS, *Lynn*, 2 Nov. 1466 to 1 Nov. 1467.[1]

De navi Thome Wadnowe intrante x die Marcii
De Simone Burgh' indigena
item pro v doliis wadde val £x (sub. x*s.*)

De navi Face Hewson' intrante eodem die
De eodem magistro alienigena
item pro D patenis wode val v*s.* (sub. 3*d.*)

De navi Thome Johnson' intrante eodem die
De Thoma Sutton' indigena
[item] pro v doliis wode val £xv (sub. xv*s.*)

[1] Gras, op. cit., pp. 606–14. For further entries see p. 197, *infra*.

De navi Brant Otto de Hansa intrante xii die Maii
De Hennying Burying de Hansa
[item] pro xxiii pipis Hans (?) wode val £xxx
(sub. xxx*s*.)

F. TAXATION IN THE SIXTEENTH CENTURY

Attention has already been drawn to the fiscal chaos of the Middle Ages, but the consideration of the most important single cause of that confusion has been left to the present section. Throughout the early historical period, one fact emerges which defies rational treatment, namely the power of the Crown—a power which was fully exerted in matters of finance. Later development certainly enhanced the control of the Commons in money questions, but the Crown still retained and used its prerogative rights. The monarch invariably sought to anticipate the revenues, and adopted varying expedients for raising money immediately without awaiting the returns of the tax collectors. A facile and ready method of mortgaging future revenues was the sale of licences, which granted to the holder the right to import and export dutiable goods free of all national and semi-national customs-dues. From the 14th to the 16th centuries such sales became increasingly frequent. The greatest development of this practice was found in the reign of Henry VIII, when the sale of licences reached such proportions as to turn the fiscal laws into a mere farce. The licences granted by Henry also permitted the import of wine and woad in foreign bottoms.

The following table [1] shows the number of licences granted between the years 1509 and 1530, during the

[1] G. Schanz, *Englische Handelspolitik*, 1881, p. 370.

reign of Henry VIII, giving the holders the right to import woad into England in foreign ships:

Year.	*Number of licences issued.*	*Number of tuns of Gascony wine or Toulouse woad permitted under the licence.*
1509	5	470
1510	6	585
1511	4	600
1512	4	1,050
1513	14	6,800
1514	12	10,680
1515	15	10,522
1516	10	9,549
1517	5	1,575
1518	6	1,970
1519	4	1,100
1520	5	1,700
1521	31	1,100
1522	1	–
1523	5	3,980
1524	3	4,500
1525	5	2,700
1526	8	3,000
1527	10	1,380
1528	5	900
1529	3	1,700
1530	1	200

In the section dealing with the 15th century a number of extracts were quoted from the accounts of the collection of a subsidy in the year 1467 at the town of Lynn;[1] a further set of extracts are given below for the same town in the year 1503 to 1504.[2] This account gives

[1] For earlier references from subsidy accounts see *supra*, p. 195.

[2] Gras, l.c., pp. 646 f. 'Wade', 'woade', and 'woode' are variants of 'woad'.

several consignments of woad to native and alien merchants, as well as three examples of general interest which are quoted in full.

De navi vocate Le Andrew de Lenne unde Petrus Howard
est magister intrante xviii die Decembris
De Ricardo Amfles indigena
pro xxx balis wade val. £v. (sub. v*s.*)

De navi vocata Le Margett de Lenne unde Willelmus
Davyson est magister intrante xxviii die Decembris
De Johanne Davy indigena
pro ii doliis woade val. xx*s.* (sub. xii*d.*)

De navi vocata Le Antony de Lenne unde Johannes
Maunderston' est magister intrante iiii die Januarii
De Willilmo Trew indigena
pro xvi balis woode val. £viii (sub. viii*s.*)

A controller's account for the three months April to June 1509[1] for the port of London shows some seventy-one entries of woad imports. The rate of the subsidy is at one shilling in the pound, although the account does not show this fact. The value given to the commodity is an official one. In the account the imports of aliens are considerably greater than those of the native merchants. The entries make a total import of about 3,671 bales officially valued at £3,671; at the given poundage this would amount to £183 11*s.*

Extracts from the controller's account:

De Navi Nicholai de Condon xxiii die Aprilis
De Fernando Dassa alienigena lxxi bale gualdi[2] val. £lxxi
De Johanne Alonnso de Salenas alienigena
iiii^{xx} ii bale £iiii^{xx} ii*s.*

[1] Gras, l.c., pp. 560, 562, 564–8, 571, 578. 'Gualdum' is here a variant of 'woad'.

[2] Subsidies of poundage were at so much per pound value and were usually at the rates of 6*d.*, 8*d.*, or 12*d.* per £.

De Alnero de Arma alienigena xxxv bale gualdi £xxxv
[In this ship there were five consignments of woad.]

The effective and unified collection of any system of customs-duty must depend on the provision by the taxing authority of rate-books. The earliest rate-book that has been found is dated July 15th, 1507;[1] the list is badly arranged though grouped under the letters of the alphabet; but there is no attempt made to arrange the commodities in order.

Wood called Jenne[2] wode the balle	xx*s*.
Wood called Tholows woode the balle[3]	xx*s*.

Of more modern appearance is the table of British imports for the year 1570;[4] the table gives the bulk, value, assessment, custom, and subsidy, and contains the following details with regard to the dye woad:

	Bulk.	*Value.*	*Assessment.*	*Custom.*	*Subsidy.*
Woad	17,300 lb.	£841 3*s*. 4*d*.	£264 6*s*. 8*d*.	£13 2*s*. 4*d*.	£1 12*s*. 6*d*.

It will be observed that the dye is assessed at about one-third of its value; the rate for customs is approximately 5 per cent., and the subsidy is about one-eighth of the custom.

G. TAXATION IN THE SEVENTEENTH CENTURY

The seventeenth century witnessed the greatest state and political experiments ever carried out in the history of these islands. The revolutionary era that was, like some fell epidemic disease, to attack all the countries of Europe almost two centuries later, was anticipated in England during this century. The fiscal system

[1] Gras, l.c., pp. 694 f.
[2] 'Jenne' a variant of 'Genoa'.
[3] 'Tholows' a variant of 'Toulouse'.
[4] H. Hall, *History of the Custom-Revenue*, ii, p. 244.

reflected these upheavals, and, on the return to the monarchical system, the need of money compelled the House of Commons to tighten its system of customs-duties and their collection. A subsidy was granted to Charles the second in the 12th year of his reign,[1] and to the enactment was appended a list of the commodities affected by the subsidy. The schedule is carefully detailed and states the unit of rating and the custom for import and export.

The following entries relate to Woad:

Description of merchandise.	*Bulk rated.*	*Customs.* *Import.*	*Export.*
Woad, green [2]	ton	£15	
Woad, Tholouse	cwt.	£1 13*s.* 4*d.*	
Woad	ton		£15

By the end of the 17th century the use of woad as a dye had been largely superseded by indigo, and therefore disappears from the lists of taxes. The quotations given above, however, make it possible to follow the continuity of references to woad in all the important documents relating to the customs-duties, and this continuity clearly indicates the economic importance of the commodity. It has been well said that the greatness of England was founded on the wool trade. Even to this

[1] These rates refer to 'the Subsidy of Tonnage, and the Subsidy of Poundage and the Subsidy of Woollen Cloths or Old Drapery, as they are rated and agreed by the Commons House of Parliament, set downe and expressed in this Booke, to bee paid for according to the Tenor of the Act of Tonnage and Poundage from the four and twentieth day of June inclusively in the Twelveth Yeare of His Ma^ties Raigne, during His Ma^ties life'.—Hall, ii, pp. 267, 273.

[2] The expression 'green woad' refers to the practice of some farmers of bringing to market bales (weighing 100 kilos) of pulped and balled green woad leaves (before fermentation had taken place), in which case the dyers used to prepare their own dye.

day the Lord Chancellor sits on the Woolsack. The woad dye, described in the statutes as the 'honest colour', and which at one time formed the basis of nearly every dyeing process connected with wool, shared with the great wool trade the honour of largely conducing to the prosperity of England.

CHAPTER XII

WOAD IN ECONOMICS

THE science of economics studies the general problem of material welfare, and aims at discovering the uniformities or laws that govern the increase or diminution of that material welfare. It is in the history of the development of some single industry and its correlation with general production that the data of the science are found, and in which its generalizations can be tested. It is probable that increasingly exact analyses of separate industries will be undertaken and will prove the most fruitful field of future economic inquiry. It will be obvious that such detailed treatment lies beyond the scope of these pages as it would necessitate the examination of the growth of the technique of woad production from the first humble woadman with a plant of low woad content to the intensive farming of an improved species giving large amounts of fine quality dye. The analysis of the improved dyeing processes and the general improvement of manufactures—the corollary of increased material welfare—would be followed by the consideration of the general problems of the development of international trade, the importance of localization, and the relation of the dye industry to the industrial structure as a whole, with the further questions of national revenue. Some of these questions have been alluded to in the above pages and it will be only possible to select the following for closer consideration.

A. WOAD AS A SOURCE OF WEALTH.

B. WOAD IN RELATION TO COSTUME.

C. WOAD IN RELATION TO AGRICULTURE.

A. WOAD AS A SOURCE OF WEALTH

In the study of woad as a source of wealth we are severely handicapped by the scarcity of statistics. Those of even a hundred years ago are sadly deficient, while when we go back for four or five centuries we find ourselves groping in the dark. The fullest statistics come from Germany and Italy, but even these are often incomplete. We have, however, some scattered information which justifies certain general conclusions.

In regard to the production of woad Thüringia takes the first place. In that province no less than three hundred villages were devoted to the cultivation of this dye-plant, and we have some estimates as to the total production. Thus Crolach states that in his day, i.e. about the middle of the 16th century, when the cultivation of woad had passed its golden era, a farmer could make an annual profit of £3 an acre.[1] If we accept Lauterbach's estimate that each of the 300 villages in Thüringia on an average cultivated 50 acres, we obtain the following result:

If 1 acre yields a profit of £3,
and 300 villages cultivate 15,000 acres,
these 300 villages will yield a profit of £45,000.

A more recent estimate is that of Schreber, who calculated that when the woad industry was at the zenith of its prosperity many villages made a profit of £1,800–£2,400 (12,000–16,000 Taler).[2] If these figures in any way represented average profits, 300 villages might well make profits of £540,000–£720,000.

[1] Crolach, *De Cultura Herbae Isatidis, 1555* (reprinted in Schreber, p. 35).
[2] D. G. Schreber, *Beschreibung des Waides*. The Taler is here taken as equivalent to 3*s*.

There is obviously a serious discrepancy between these estimates which we shall not attempt to reconcile. Doubtless there was considerable variation in the value of woad at different periods, as well as in production of the dye. At any rate the Thüringian villages made a good income out of their woad fields. A third of the total income of that province is said to have been derived from woad. Well might Thüringia, like the Languedoc, be termed a *pays de cocaigne*—a land flowing with milk and honey.

Thüringia, however, was only one province of Germany. The aggregate revenue from woad would have been vastly increased if in our statistics we were able to include the profits earned in the other woad areas, e.g. in the Jülich district, in the Mark, in Meissen, Braunschweig, Magdeburg, and Silesia. Unhappily the necessary figures are not available.

Some statistics, however, have survived which enable us to estimate the consumption of this dye-stuff in individual towns. At Nürnberg during the 14th century there was an average annual consumption of 103 wagon-loads of woad, which increased during the 15th century to 211 wagon-loads. If we take the value of the woad at the average price of 12*s*. the *Mass*, and each wagon-load comprised *c*. 16 *Mass*, the total value of 103 wagon-loads would be £988 16*s*.; 211 wagon-loads would be worth *c*. £2,025. Again, in Görlitz the trade in woad for 1477 amounted to 9,000 *Mass*. As each *Mass* at that time was worth *c*. £4, the value of 9,000 *Mass* was no less than £36,000.

It was not only the indigenous dye-works that consumed Thüringian woad; during the Middle Ages Germany supplied a large part of north Europe with a

portion of its requirements. This exportation of German woad began at quite an early period. The export from the Mark, Meissen, Magdeburg, Braunschweig, and Saxony during the 13th century has already been alluded to, and probably became a regular trade. In the customs statistics of the Netherlands German woad plays a large part all through the Middle Ages; Guicciardini specifically mentions woad (pastel) as amongst the principal commodities which were exported from Germany to Antwerp.[1]

Large quantities of woad were also shipped across the Channel, especially during the 14th and 15th centuries, when but little woad was cultivated in England, and where all black and blue fabrics were dyed with woad. Even as late as the days of Queen Elizabeth woad was regularly shipped by the Hanseatic league to England.

Poland, Hungary, and Italy also imported woad, especially from Thüringia and lower Austria; Waidhofen was at that time the principal exporting town of Austria.

Unhappily we do not know the quantities of woad that went to these countries or what sums of money were returned in payment. But enough has been stated to prove the important contribution made by the woad industry to the economic prosperity of the various countries concerned.

One signal advantage of this industry from an economic standpoint was the fact that it benefited every section of the community. The State as well as the Local Authorities were enriched by tolls and taxes, the ground landlords received higher rents, the woad merchants as a rule accumulated wealth, the farmers

[1] R. H. Tawney and E. Power, *Tudor Economic Documents*, 1924, iii, p. 165.

enjoyed a larger income through the lucrative returns, the labourers earned good wages for tilling the fields and 'balling' and fermenting the woad; indeed there was some degree of integration of the various branches of the industry.

Amongst other beneficiaries may be mentioned the builders who erected the woad mills, the coopers who constructed the woad casks and other appliances, and the waggoners who transported the woad to neighbouring towns. Further, labour in connexion with woad extended over most months of the year and thus provided regular and not merely casual employment. Every section of the community derived substantial profits from its share in the industry.

In early days small farms were controlled by the workers themselves. In the 14th and 15th centuries these holdings belonging to individuals were replaced by large holdings controlled by capitalist companies.

Erfurt presents an illustration of a town which attained a great importance in the Middle Ages, mainly as a result of wealth derived from the woad industry. This accumulation of wealth made it possible for the town to extend its boundaries, so that in course of time it annexed over a hundred smaller localities including several burghs, fortified castles, and villages; indeed it was one of the first towns that grew rich enough to maintain mercenary troops. In course of time Erfurt actually became wealthy enough to found and maintain a University out of its own resources. This University, which received its charter in 1392, owed its establishment in large measure to the woad fields of Thüringia, and was a noble memorial of the generosity of the civic woad lords.

Italy is another country in which woad played an important part in economics, Florence, at one period the chief commercial city, taking a leading place. That city owed much of its prosperity to the efficient organization and ample resources of its guilds, which were able to embark on important capitalist enterprises for the benefit of their members. Some illustrations of these may be found in connexion with the company of Dyers which formed part of the powerful Wool Guild.

By the accumulation of wealth, by the acquisition of freehold properties, by the purchase and distribution of large quantities of raw material at wholesale prices, by the supervision and control of dye-works, and in many other ways, the Wool Guild acquired a position of great influence. It yields a striking example of capitalist production at a time when such industrial enterprise by guilds was all but unknown.

Reference has already been made to the central woad hall in which the woad industry was concentrated. The Hall was controlled by officials of the Wool Guild. Such a concentration served two purposes. In the first place the Guild was able to control the quality of the woad and other pigments which the dyers required for their vats; it also ensured a constant and sufficient supply of these raw materials. At any moment the Guild could ascertain the exact quantity of each dye and the mordant in the warehouse, and thus regulate the supply; this was done by the purchase of large quantities at wholesale prices. As early as 1345 we find the Guild contracting with two merchants for the importation of woad in huge quantities, and from that year onwards there was a rapid development of such

capitalist activities.[1] The said contract bound the two merchants, who were financed by the Guild, to import 150,000 lb. of woad from the district of Bologna and to store it in the woad hall by the end of June. For this they were to receive a commission of 200 florins. Should less than 100,000 lb. be imported no commission was payable. If the quantity reached 130,000 lb., the commission was to be 130 florins.[2]

In 1377 a still larger quantity of woad, viz. 690,000 lb., was purchased and warehoused by the Guild. This was then sold to the various clothmakers and dyers in proportion to their requirements, while the price charged for the dye was regulated by a committee on the principle that the Guild must just cover its expenses.[3] Other dyes, especially madder and the mordant potash, which were also stored in the woad hall, were treated on a similar basis.

The Guild, however, not only used its capital for providing the dyes and the mordants required by its members; it also did its best to stimulate production. In fact it took a direct and active part in the dyeing industry. Not only did it intervene in order to provide cheap raw materials, but by the use of Guild capital it endeavoured to keep down the price of labour. Many records of contracts are still extant which the Guild made

[1] During this period of commercial activity special copper and silver coins were struck for the use of the Guild in its business transactions. Thus in 1347 the consuls obtained permission to strike these coins at the Florence mint. (A. Doren, *Die Florentiner Wollentuchindustrie*, 1901, p. 395.)

[2] A. Doren, *Die Florentiner Wollentuchindustrie*, pp. 369, 529.

[3] Some statistics are extant which throw light on the price of woad. In 1375 the consuls of the Guild sold 100 lb. of woad for 52*s*. In 1378 100 lb. were sold for £3 13*s*. In order to keep down the prices the Guild reduced its commission to 2*s*. 3*d*. per 100 lb. (A. Doren, l.c., pp. 536, 538.)

either with the individual dyers or with trading companies.[1] Thus, in return for a loan of money or on condition of sharing his profits with the Guild, the dyer might contract to set going a minimum number of cloths, since a definite number of samples, whether of wool, yarn, or cloth, were dyed in each vat. Further, every dyer under such a contract had to work under the direct supervision of the Guild. A few years later (1451) the Wool Guild actually erected its own dye-vats; these, however, were soon afterwards leased to individual dyers, as the direct management by the Guild proved unprofitable.[2] During the second half of the 15th century the industrial activities of the Guild gradually ceased, and the capitalist enterprise to which it had for many years devoted so much energy came to an end. In no other country, however, has capitalist enterprise connected with woad developed on such a gigantic scale as it did in Italy.

As regards France, the Toulouse and the Somme districts were both celebrated as woad areas and derived large profits from the woad industry. The Toulouse woad, indeed, became a great favourite with the Mistery of Dyers, and was in universal demand.

In England the woad industry was never organized to the same extent that it was in Germany, France, and Italy. Indeed, during the 14th, 15th, and 16th centuries the supply of woad grown in England was entirely inadequate to supply the demand. The door was thus opened for the extensive imports from Germany and France, opportunities of which these countries were not slow to avail themselves.

[1] A. Doren, *Die Florentiner Wollentuchindustrie*, pp. 376 f.

[2] A. Doren gives the wages paid to the woad dyers in the dye-works erected by the Guild in 1463. (*Die Florentiner Wollentuchindustrie*, 1901, p. 513.)

Apart from its utility in bringing great wealth to individual nations woad contributed to the economic life of Europe as a whole. By forming an important article of exchange between distant countries it promoted international friendships and thus added materially to the welfare of various European states.

A few quotations will now be given to show that the importance of woad as a factor in economic welfare was well recognized.

When H. H. Henry von Meissen consulted his Councillors as to the political future of Thüringia they replied:

'Thüringia, your Highness, is a great and rich country: do not dispose of it or split it up. Indeed it is so valuable that if your Highness had one foot in heaven and one on the earth in Thüringia, it would be best to withdraw the foot from heaven and to remain in Thüringia.' [1]

Crolach writes:

'The cultivation of woad brings food to the peasant, wealth to the burgher, and is a rich mine for all Thüringia.' [2]

He also tells the following story:

'A resident in Thüringia was once advised to invest some money in gold and silver mines in the mountains, when he replied: "I have at home some woad fields which yield me rich returns, when my bailiff has ploughed them a few inches deep. Other persons may burrow far into the crust of the earth in their search for gold and silver. I already possess a mine of gold and silver which gives me rich ore on the surface, so that I do not need to dig it out of the bowels of the earth."'

Coler writes:

'The land of Thüringia is highly productive in various crops, especially in corn and wine. But woad brings more foreign money into the country than do all the other crops combined.'

[1] von J. H. Falkenstein, *Thüringische Chronik*, 1735, pp. 149, 150.
[2] Crolach, l.c., p. 48.

Riska says:

'The woad industry not only keeps money in Thüringia, but it also causes much money to flow in from foreign countries. It is useful in three ways:

(1) The labourers who till the woad fields earn good wages with which to support themselves and their families.

(2) The land magnates, the burghers and the tenant farmers who cultivate and manufacture woad derive large profits from the industry.

(3) The Elector finds that his rents mount up, whenever the industry is prospering.'[1]

B. WOAD IN RELATION TO COSTUME

The economics of costume is a topic which deserves some brief reference in this place, since woad was the principal dye used in the Middle Ages. The development of the artistic faculties of a people is not only a question of aesthetics; it also has a bearing on industrial efficiency, since such efficiency is enhanced by any increase either in mental or moral strength. In other words, the psychological effect of a garment dyed in woad must have reacted beneficially on the wearer. Thus woad has a place in the history of culture. Where fashionable dress is habitual it may prove what Marshall calls a 'conventional necessity', since in order to secure it the average person will sacrifice something that is necessary for efficiency. Thus his wages are in some measure inadequate unless they permit him to devote a certain sum to such conventional necessities.[2]

The poorer classes usually wore clothes of the natural colour of wool, i.e. either black, brown, or grey, and to

[1] L. Riska, *Waidbedenken*; cf. Schreber, *Die Beschreibung des Waides*. This quotation recalls the German proverb: 'Thüringia produces three commodities—wine, wheat, and woad.'

[2] A. Marshall, *Principles of Economics*, 1891, i, p. 122.

a lesser extent white. Persons in somewhat better circumstances preferred dyed clothes, and the blue derived from woad was highly fashionable, largely owing to its durability when exposed to bright sunshine, to rain, or salt water. Other colours were also obtained from woad by the admixture of other dyes; amongst these were black, green, and even some shades of red.

At various periods in European history there was lavish indulgence in matters of dress, and as woad colours were popular, large quantities of that dye were called for. In England display of dress was perhaps most ostentatious in the reign of Edward III, whose tournaments and pageants were gorgeous spectacles.

The dyeing of cloths of various colours by means of woad consumed an extraordinary quantity of dye. Three pieces of cloth are said to have consumed about one barrel of woad. Riska estimates that before the Thirty Years' War a single dyer probably consumed something like 100 casks of woad per annum.[1]

There was also an enormous luxury in matters of dress in the 15th and 16th centuries in Germany, at that time the richest country of Europe. Geiler von Kaiserberg asserts that at that time burghers' wives wore clothes often worth from £30 to £40, and this at a period when money was so scarce that a comfortable little house could be bought for £30. There was in fact at this time a greater display of dress than had ever been known before; it began as early as 1400, and this luxury persisted, in spite of all attempts by the government to limit the extravagance, until the end of the 16th century.

The famous Calimala and the Wool Guilds of

[1] L. Riska, *Waidbedenken*, p. 94 (reprinted in Schreber).

Florence, which have been described in Ch. ix, were each of them closely associated with the use of woad by the wealthy classes all over Europe who cared much for a smart appearance and indulged in well-dyed clothing. Florence at one period led the fashion and produced beautifully dyed fabrics that commanded high prices in every civilized country. The Wool Guild imported large quantities of fine English and Spanish wool and produced an excellent cloth of high finish and tastefully dyed with woad and other pigments which no other dyers could rival. The Calimala Guild, on the other hand, imported coarse untrimmed cloths that had been dyed with fugitive dyes, passed these through the workshops of their skilled craftsmen, who sheared, pressed, cut, and re-dyed the cloths in woad and other pigments, and then exported them to the eastern and western markets of the civilized world. Thus woad played no small share in the economics of costume.

In modern times the influence of woad on costume has wellnigh ceased. The famous dye, however, still plays a humble part in the woad vat as described on previous pages. And from the woad vat emerges that cloth of almost indestructible colour from which the uniforms of the London police and other servants of the Crown are still manufactured.

C. WOAD IN RELATION TO AGRICULTURE

Probably the most important part that woad has played in economics is the influence it has exerted on agriculture as a whole; it has thus been of direct service to the entire community. The intensive culture that is demanded by woad, if the crop is to yield the rich returns of which it is capable, has made its method of

cultivation an example to all other farmers. It is in Germany and in France that this beneficial influence of woad on general agriculture has been most apparent, although it has also been felt in some measure in other countries. A quotation from Lauterbach describes the experience of farmers in Germany:

'The woad industry exerted a profound influence on agricultural economics in the Middle Ages. Just as sugar-beet farms in modern times have become models of intensive cultivation for all branches of agriculture and have thus raised the whole standard of husbandry, so did the cultivation of woad six hundred years ago.' [1]

Woad, if it is to be a really profitable industry, requires constant and skilled supervision, and this indispensable attention transformed woad areas, such as that of Thüringia, into highly productive districts, which reacted beneficially on the cultivation of all the other crops grown in the surrounding districts.

In other words, woad is an intensive crop requiring careful selection and treatment of the soil and a constant supply of skilled labour as well as expert supervision; otherwise the supply of the dye-yielding root leaves, as well as the proportion of dye that can be extracted from them, falls much below the maximum attainable. Thus the woad farms, through the high standard of efficiency required, set an example to all branches of agriculture and stimulated other farmers to increase the productivity of their other crops. Possibly no crop was ever better grown. All the cereals, when subjected to similar intensive treatment, yield much higher returns.

Farmers of the 13th, 14th, and 15th centuries cultivated their fields in a most haphazard fashion, doubtless

[1] F. Lauterbach, *Der Kampf des Waides mit dem Indigo*, 1905, p. 47.

because the ordinary cereals would grow and ripen without any special preparation of the soil or any skilled attention during the maturing of the crop. Until the advent of well-managed woad farms there was no compelling force making for efficiency, and farmers were too lethargic ever to dream of a rational treatment of their fields.[1]

A radical transformation set in as soon as woad began to be cultivated systematically. In the first place, repeated and deep preliminary ploughing was indispensable, followed by manuring and harrowing. Next, during the growth of the crop, careful hoeing three or four times was necessary for the thorough extirpation of weeds. In brief, woad, for a lucrative return, necessitated meticulous care. No other crops grown at that period required so much skilled attention as did woad.

The husbandman in olden times would never have dreamed of choosing and of cleaning his land as did the woad farmer. A comparison of land which has been under sugar-beet with land under other crops admirably illustrates the difference. Only when large areas are cultivated with root crops that need hoeing and weeding is the importance of keeping down the weeds fully realized.

Further, the picking, washing, crushing, and 'balling' of the woad leaves were operations that filled up a large part of the summer months, ten persons working a full day being required to crop one acre of plants. Later on operations of breaking up and fermenting the woad provided much additional employment, extending over

[1] This was perhaps rather largely due to the feudal mode of tenure and control.—A. R. H.

many weeks. When the year's crop had been prepared for the market, it was time to prepare the land for the next year's crop. Obviously, this series of operations necessitated a far more constant supply of manual labour than did the growing of wheat or oats. Indeed, during the months of woad cropping the local supply of labour often proved insufficient, and agricultural gangs, organized under a gang-master, were called in to supplement the local supply. This system was largely in vogue in Thüringia, as we have seen in Ch. viii. Thus, by its influence on agricultural efficiency, woad has rendered conspicuous services and has deserved well of the community.

Blith many years ago described the part played by woad in the economics of the 17th century. His words are worth recalling to memory:

'First, woad is nationall in that it sets many poor on work. It is the staple and chief of the Dyers' Trade, layeth a foundation for all holding colours, and much advanceth land in the rent it doubles or more, and in the usage of it upon this husbandry trebleth or quadrupleth it and many times more: and then secondly it is personally advantagious. The best Estates that hath been got in all our rich upland countries have been got by it; at some seasons, and when they have a right crop and good markets, it will amount unto as much more: it has been sold from twenty pound the best Woad to thirty pound, and back again from thirty pound and twenty-six pound down to six pound a Tun.' [1]

There is a touch of romance in the thought that the humble woad plant may have helped to teach the mediaeval farmer the enormous value of intensive cultivation and thus prepared the way for the high productivity of the golden fields of wheat which feed

[1] W. Blith, *The English Improver Improved*, 1653, p. 234.

the civilized world to-day. A single ear of corn may bear as many as fifty precious grains as the result of intensive culture.[1]

Wheat has recently been called a 'pillar of civilization', since human culture and all that it implies came to fruition when wheat was first evolved from such primitive varieties as 'Emmer' or 'Spelt'. Woad, however, may be regarded as a still older 'pillar of civilization' if in a measure it helped to show the early husbandman how to increase the productivity of his cereals. By so doing it would multiply the supply of wheat, bringing it in time even within the reach of the poor, and thus contributing materially to human health and welfare.

In brief, with a little poetic fancy, we may see in woad a plant which has helped to evolve the most precious fruit of the earth, to which we owe an everlasting debt. We may indeed personify this historic plant and exclaim: *Isatis tinctoria, hominum benefactor, in perpetuum ave!*

[1] Prof. J. Percival (*The Wheat Plant*, 1921, pp. 414 f.) gives an admirable account of the increasing yield of wheat from the 13th century onwards, as a result of intensive cultivation.

CHAPTER XIII

WOAD IN THE FINE ARTS

IT will be convenient to deal with this subject under the following headings:

A. WOAD ON THE ARTIST'S PALETTE.

B. RECIPES FOR MAKING PAINT FROM WOAD.

A. WOAD ON THE ARTIST'S PALETTE

The use of woad in the fine arts is a subject of considerable interest to students of the history of painting, although up to the present time but scanty attention has been paid to it. We know that during the 13th, 14th, and 15th, and probably 16th centuries Italian artists largely used a blue dye prepared from the froth which floats on the surface of woad vats, and which was called 'flower of woad' or 'flory'.[1]

This woad pigment, identical with the blue pigment extracted from the tropical *Indigoferas*, was formerly called indigo, the double application of this word being met with as early as the first century of the Christian era.

Pliny (*c.* A.D. 23–79) tells us that indigo can be obtained either from the scum of the dyer's vat (i.e. the woad dyer) or from India (i.e. from the *Indigoferas*), while Dioscorides (A.D. 77–8) writes:

'There are two kinds of indigo. The one grows spontaneously in India, issuing as a froth from reeds. The other is made from dyes and is a purple scum floating on the cauldrons: the dyers collect it and dry it. The best is that which is an azure colour, smooth and succulent.'[2]

[1] J. Parkinson, *Theatrum Botanicum*, 1640, p. 602.

[2] P. A. Matthioli, *Medici Senensis Commentarii Sex Pedacii Dioscoridis*, 1554, p. 602.

Indian indigo was also known as indigo bagadel (i.e. from Bagdad), indigo baccadeo, indaco and indebas.

Matthioli (1500–77), in commenting on Dioscorides, writes:

'The indigo used by painters and generally sold by apothecaries is made from the froth and scum of the woad, with which dyers dye wool. As for the natural indigo, which comes out of the reeds as froth, we do not have it as far as I know.'

Our chief authorities for the use of woad by painters are two MSS., one at Bologna, the other at Venice. The first is a famous 15th-century MS. entitled 'Segreti per Colori', preserved in the Library of the convent of St. Salvatore in Bologna, which has been translated into English by Mrs. Merrifield.[1]

It gives no less than nine recipes for the preparation from woad of what is called 'indigo', and other recipes for what is called 'azure'. Thus artists evidently obtained two shades of blue from the woad vat.

This indigo[2] was sometimes prepared by pounding the actual woad herb and making it into little balls, which were then mixed with sulphur and alum (Recipe I). In other cases the dye was prepared from the scum skimmed from the surface of woad vats. This scum was mixed with fine plaster of Paris and white of egg, and dried by desiccation (Recipes II, III, and IV). A third process consisted in the conversion of the woad into a paste by the addition of urine and vinegar. This paste was dried in the sun, flower of woad being added until the desired colour had been attained (Recipe V).

[1] Mrs. M. P. Merrifield, *Original Treatises on the Arts of Painting*, 1849, ii, pp. 340, 412 f.

[2] J. Ruellius also states that 'our dyers call the blue scum that forms in the vat during boiling *indum*, and this they dry for the use of painters'. Cf. *De Natura Stirpium*, 1536, Bk. II, c. cxv, p. 575. Du Cange, *s.* 'Guaisdium', says: 'hanc spumam ad pictorum usus siccant.' (*Glossarium*, 1733, iii, p. 973.)

B. RECIPES FOR MAKING PAINT FROM WOAD

The following five prescriptions will illustrate some methods of preparing the dye:

RECIPE I

'*To make Indigo* [1]—Take the herb woad, pound it very fine, and make it into little balls like apples. Next for every lb. of woad take two oz. of common salt, three oz. of sulphur vivum, and one oz. of rock alum. Grind these with the herb, and afterwards place them in a copper vessel of clear water, and mix them to the consistence of a moderately thin sauce. The vessel is next to be placed over a clear fire, and allowed to remain until the contents have become like dough. Now spread out the dye in a thin layer, cut it into pieces with a knife, and allow it to dry. In this way a good indigo will be obtained.'

RECIPE II

'*To make Indigo*—Take two oz. of fine plaster of Paris "gesso sottile", and grind it well with ten oz. of dried woad, that is the flower or froth of woad; mix the resulting mass with a little prepared white of egg. When well mixed dry the mass in the sun, and cut it into pieces. If a little rock alum dissolved in water is added during the grinding stage a good and fine indigo will be obtained.'

RECIPE III

'*To make fine Indigo*—Take one part of the flower of woad, bake it well in an earthenware shovel and grind it to a fine powder. Next take five parts of lime, such as is used by fellmongers, and pound and mix it well with the powdered woad. Afterwards grind the whole

[1] In each of these recipes the word 'indigo' stands for 'woad indigo'.

mass with clear water on a stone slab, as is done with paint, spread it on a smooth table and dry it a little in the sun. The resulting mass may now be broken into small pieces, and again dried in the sun or at a fire. . . . If the colour is not as deep as is desired, the operations may be repeated as often as necessary. Finally the dried dye may be kept until required.'

RECIPE IV

'*To make Indigo*—Take three parts of finely ground plaster of Paris and six parts of flower of woad; mix and grind them well together until they form a paste of good colour. This paste is then to be spread out on a slab of marble or other hard stone until quite dry. It is then sprinkled once or twice with a solution of rock alum, more woad being added until the mass is as thick as porridge. It is then spread out and allowed to dry. When thoroughly desiccated the dye may be kept until wanted.'

RECIPE V

'*To make Indigo*—Take some flower of woad, and make it into a paste by the addition of strong vinegar and urine. This paste must then be dried in the sun. If the colour is too pale more flower of woad can be added, until a rich colour has been obtained. The final product may then be cut into pieces, dried, and preserved until wanted.'

The flower of woad was not only used in the production of indigo blue. It was also employed as a source of what was called azure, 'azzurro', a sky blue similar to that usually obtained from blue verditer, i.e. blue carbonate of copper, and which resembled ultramarine.

The following three recipes were used for the preparation of this azure:

RECIPE VI

'*To make Azure*—Take one lb. of lime made from marble or travertine, one lb. of verdigris, two lb. of sal ammoniac and grind them together to a fine powder. This powder is next made into a stiff paste with the addition of spirits of wine, wrapped in a cloth and covered with dung for about a month, when the paste will have become as hard as stone. This hard mass is then ground to a fine powder and mixed with flower of woad in the proportion of one lb. of powder to 2 oz. of woad. This mixture is then rubbed up with a little spirit of wine and dried. It can be kept in a leather bag and excluded from the air.'

RECIPE VII

'*To make Azure*[1]—Take the shells of hens' eggs that have been well washed, and place them in a new jar, and lute the jar with lutum sapientiae.[2] Calcine the shells and grind them into a fine powder on a stone slab. Next take some true indigo dissolved in water and mix the lime derived from the egg shells with the dye by grinding them both together on the stone, adding a little

[1] Merrifield, l.c., i, p. cxcvii; ii, p. 390. Another recipe is given on p. 386 (No. 31), if Mrs. Merrifield's suggested emendation of the text is accepted. Apparently woad indigo and tropical indigo were sometimes mixed in the preparation of artificial azure. No doubt the tropical indigo was the usual source of a light blue or azure; it was, however, sometimes replaced by woad indigo. It may well be that the blue mantle in which the Virgin is so often arrayed at times owed some of its colour to woad. Cf. C. J. Herringham, *The Book of the Art of Cennino Cennini*, 1899, pp. 47, 258.

[2] Lutum sapientiae consisted of white of egg beaten to a froth and mixed with iron filings. It was used for luting vessels.

indigo from time to time until the mixture assumes a good colour. If you have no indigo substitute the froth of dyer's woad and proceed as before.[1] Remove the froth while the woad is boiling in the dyer's cauldron and mix it with the egg shells; afterwards dry and keep it.'

RECIPE VIII

'*To make Azure*—Take some very white marble, and roast it in the fire for a day and a night; when it is calcined grind it into a fine powder on a marble slab. Next take some of the froth of indigo or woad which is formed in the dyer's vat, and soak the powder in it. Continue to do this until you have obtained the azure colour that you want; then dry it and keep it until required.'

Another valuable reference to woad is contained in a MS. preserved at the Library of St. Marc (Libreria Marciana) at Venice and dating from the early or middle 16th century.[2] The methods there described (Recipe IX) for preparing colours were those probably employed at Rome and at Florence during the best period of Italian art. This Recipe deals with the preparation of what is called indigo from the flower of woad.

RECIPE IX

'*To make Indaco*[3]—Take flower of woad and alum water, boil them together and strain through a linen

[1] This recipe shows that bagadel and woad indigo were sometimes used as alternative dyes.

Another recipe, if Mrs. Merrifield's proposal to substitute 'flower of woad' for the unintelligible words 'flower of metal' is accepted, indicates that woad and bagadel indigo were at times used simultaneously. (Cf. Merriman, l.c., ii, p. 386.)

[2] This MS., entitled 'Secreti Diversi', has also been translated by Mrs. Merrifield, *Original Treatises on the Arts of Painting*, 1849, ii, pp. 606, 608, 612.

[3] 'Indaco' is one of the variants of indigo.

cloth. The solid residue remaining on the cloth is then spread out on a tile and well dried. The result will be a fine "indaco".'

Unhappily we do not know which artists kept woad blue on their palettes, nor for what pictures it was used. Indigo ranked as one of the somewhat fugitive colours and would on this account alone be avoided by careful artists.[1] As already mentioned, woad was cultivated in the Oxyrhynchus district of Egypt, but whether its dye was used by artists as well as by dyers is not known.[2] It may well be that the indigo so often alluded to in connexion with mummy cloths, &c., was actually derived from woad.

The practical identity of the dye obtained from the *Indigoferas* and from woad apart from purity makes it impossible to distinguish between the pictures for which one or the other kind of indigo has been used. Doubtless both kinds remain unchanged on the addition of acetic acid, but are bleached by chlorine.[3]

To-day woad dye has vanished from the artist's palette, after competing for centuries with indigo derived from the *Indigoferas*. The low cost of the latter combined with its facile extraction and its more vivid

[1] The choice of pigments often depended on the artist's purse. The superb blues usually prepared for the adornment of saints and especially for the mantle of the Virgin were usually the azzurro della magna or ultramarine. Their high cost, however, would tempt poor artists to substitute indigo either from eastern sources or from woad, the cheapest blue dye. Some tests for fugitive dyes are given by A. H. Church, *The Chemistry of Paints and Painting*, 1890, p. 299.

[2] A. Lucas (*Ancient Egyptian Materials*, p. 199) states that indigo was almost certainly not cultivated in ancient Egypt, but was probably imported from India.

[3] A. P. Laurie, *The Pigments and Mediums of the Old Masters*, 1914, pp. 55, 57.

colour have given it the victory. Moreover, of recent years artificial indigo has largely superseded even the temporarily victorious tropical indigo.

In the history of art, however, woad will be held in perpetual remembrance. It holds a place of honour as one of the sources of the glorious blue which has contributed so much to our full enjoyment of colour.

CHAPTER XIV

WOAD IN HERBALS

THE subject will be discussed under the following headings:

A. THE IMPORTANCE OF WOAD IN HERBALS.
B. EXTRACTS FROM VARIOUS HERBALISTS.

A. THE IMPORTANCE OF WOAD IN HERBALS

Woad received considerable attention in early botanical literature. Not only did its economic value impress the famous herbalists of the 16th and 17th centuries, but the fact that it was known to classical writers such as Hippocrates, Dioscorides, Pliny, and Galen increased their interest in it. Above all, the prevailing faith in its power to relieve the aches and pains of life and cure its diseases stimulated the writers to magnify its virtues and to chant its praises. On the other hand, all through the following extracts readers will be struck by an absence of any critical investigation of the truth of statements that have been transmitted from century to century.

The early herbalists, working with the plants growing around them in Western Europe, and having apparently little inkling that the flora of one part of the world might be very different from that of another, sought to identify the medicinal plants of the Greeks and Romans with those of their own countries, based on the brief and generally inadequate descriptions handed down in classical literature. The result is that, in the vast majority of instances, the identifications were totally wrong, and the prescriptions of the ancients must have

been made up of quite unintended ingredients, though possibly the treatment may have been equally efficacious.

Woad is almost certainly an exception to this frequent confusion of names. It was well known in classical times and remained in cultivation throughout the Middle Ages, so that the *Isatis* of Dioscorides is undoubtedly the *Isatis* of the Herbals.

In the following pages extracts are given from most of the important Herbals which deal with woad, and it will be more convenient to have the Latin, Italian, and Dutch extracts given as translations. The arrangement adopted is a chronological one, and the reader will frequently observe that the descriptions have very often been copied from one Herbal to another and from one language to another, generally without acknowledgement and in many cases without any important addition.

B. EXTRACTS FROM VARIOUS HERBALISTS

I. WILLIAM TURNER, *LIBELLUS DE RE HERBARIA NOVUS*, 1538, p. B ii [1]

Isatis

Isatis or Glastum is the herbe which dyers of wool use and which is usually called 'Wad'.[2]

Ia. WILLIAM TURNER, *THE NAMES OF HERBES*, 1548, p. 40

Glastum

Glastū is called in Greek Isatis, in english wad, and not Ode as some corrupters of the englishe tonge do

[1] Extracts are given from both editions of William Turner's Herbal, since the second one includes a reference to the therapeutic use of woad in the passage 'it dryeth much'.

[2] Translated from the Latin original.

nikename it, in duch waid or weid, in french Guesde. Wad is cōmō in Juliker land, and some is now set in England. The wild wad groweth plētuously in Germany beside the Rhene, and in many corne fieldes in hye Almany. Wyld wad is called in English ashe of Hierusalem.[1] It dryeth much.

II. R. DODOENS, *CRUYDEBOECK*, 1563, c. xlv

'OF WOAD'

There are two varieties of woad, of which one is cultivated and used for manufacturing a blue dye, and the other is wild, but otherwise of the same origin.[2]

Description

The cultivated Woad has long, broad, and dark green root leaves, which spread over the ground and closely resemble those of the wild plant although they are thicker and darker. The stem which springs from amongst the leaves reaches a height of about 3 feet.

The stem bears more pointed and fewer leaves, and at the top breaks into many small shoots and branches which bear many small yellow flowers, which are followed by long, broad pods resembling small tongues. At first these pods are green, but afterwards they turn brown and contain the seed.

The root of woad is white, straight, and smooth and does not spread out to any great extent.

The wild woad closely resembles the cultivated variety as regards the leaves, stem, and general form,

[1] Jerusalem Ash = *Isatis tinctoria* or *Reseda luteola*. (W. Millar, *A Dictionary of English Names of Plants*, 1884, p. 5.)

[2] This translation of the Dutch Herbal of Dodoens only gives a portion of the original, as the account in Lyte's Herbal quoted later is practically a literal translation.

except that the branches are more delicate, fewer in number, and brown in colour, while the pods are narrower than in the cultivated herb. In other respects there is no difference between the two varieties.

III. P. PENA AND MATTHIAS DE L'OBEL, *STIRPIUM ADVERSARIA NOVA*, 1570–1, p. 148 [1]

Cultivated Woad (*Glastum sativum*)

Immense tracts of this by far the best kind of all cultivated woad enrich the Toulouse district, where the flourishing herb *Guede*, when it has rotted and fermented and the juice has been squeezed out in a hand-mill, is piled into big heaps. It is called in the vernacular *Pastel*, and supplies Gaul, England, and Belgium with a dye for dyeing cloth. It is also sown in ? *circa Insulas Belgii urbem* as well as in Germany, where the rich open ground yields a woad not much inferior to that of Toulouse. In Italy woad is less common, so that it is not surprising that the learned Anguillara declared that he did not know it, and described another Norbonne wild species instead of the cultivated woad. It is not clear why Dodoens called it Vaccarium,[2] since among us cows do not eat woad, nor has it any resemblance to that plant, nor has Vaccarium any use; indeed the latter is obviously different from both woads, although it is akin to both.

The cultivated woad is known everywhere owing to its reputation as a dye. It is sown every year in rich land and produces leaves that entirely surround the straight, cubit-long stalks at the bottom, as well as thick, narrow, glaucous, or possessing the greenness of *Cynoglossum*, or

[1] This historically interesting account of woad is obscure in many places. This translation from the Latin original is an almost literal one.
[2] R. Dodoens, *Stirpium Historiae*, 1583, p. 104. The plant was probably *Saponaria Vaccaria* (*Vaccaria vulgaris* or Cow herb).

clinging like the broad-leaved *Thlaspi*. At the top it forms numerous little branches, bearing numerous pale yellow flowers in May and June, which are followed by flattened tongue-shaped pods, in which ripen dark seed. The root is white and does not penetrate to any great depth.

Wild Woad (*Glastum sylvestris*)

The wild woad is harmful to corn which it exceeds in height and bears leaves like those of Endive but much smaller; for this reason Pliny includes it among the Lettuces. It has a narrow root and a woody stem; it is straight and branched, with many leaves at the bottom, some of which produce flowers alternately but crowded at the top, of a pale honey colour. It is (used as) a garland by the inhabitants of the Gallic provinces.

Wild Woad with Ocimum-like calyx, very small pale flowers, called *Vaccaria Norbo* (at Narbonne)

The wild woad, or Vaccaria, said to resemble Ocimum, is injurious to wheat when mixed with it; its leaves are narrower and hang down (*prones* is read here for *promes*) like Wild Isatis, Ocimum, or like the frothy Poppy, more rarely on a stalk, spread out, a cubit long, and adorned with very small flowers, not unlike in seed to Ocimum or Pseudomelianthium,[1] with whitish and pale buds, hitherto not known to be of any use.

IV. M. DE L'OBEL, *STIRPIUM HISTORIA*, 1576, p. 189

Glastum sativum

Cultivated Woad[2]

Dioscorides. The leaves, when applied to tumours, cause them to disperse and cure all bleeding wounds.

[1] Corn Cockle, *Lychnis Githago* L.

[2] Translated from the Latin original.

They also arrest all forms (prostuvia) of haemorrhage and stop attacks of St. Anthony's Fire, gangrene, foul and rodent ulcers.

Galen adds that the wild variety has a wonderful power of dispersing oedematous tumours. At the same time it marvellously checks the growth of malignant ulcers, even when they are putrid and rodent. The herb will be most efficient in subduing the above-mentioned disorders if the crushed leaves are mixed with the flour of barley, wheat, or polenta.

Wild Woad (*Glastum sylvestre*)

Dioscorides. Wild woad is useful for the same diseases as those mentioned above; it is also beneficial in splenetic disorders, whether it is taken as a drink or applied directly.

Galen. The wild variety is of the greatest value in moist and putrid sores; for other diseases it is of less value. It dries them up too quickly and sets up irritation; in consequence of this inflammatory swellings are aggravated. Hence, while on the one hand its vigorous action may be useful in splenetic disorders, for the other diseases it cannot be said to be beneficial.

There are three illustrations with the following headings:

(*a*) Glastum sativum, ἰσάτις ἥμερος. Fr. Guesde and Pastel cultivé. Eng. Wode and Wad. Ger. Weidt. Belg. Weedt. Sp. Pastel. It. Guado domestico.

(*b*) ᾽Ισάτις ἀγρία Isatis syl. Ger. Wild Weidt. Fr. Pastel sauvage. Eng. Wild Waode and Wodde. Ger. Weidt. Belg. Wild Weedt. Sp. Pastel Salvage. It. Guado silvatico.

(*c*) Isatis syl. Vaccaria dicta: Thamecnemon Cordi. Glastum primum Anguil.

V. HENRY LYTE, *A NIEWE HERBALL*, 1578, p. 66

OF WOAD OR PASTEL

The Kindes

There be two sortes of Woad: the one is of the garden, and cometh of seede, and is used to colour and die cloth into blew: The other is wilde Woad, and cometh up of his owne kinde.

The Description

Garden Woad hath long, broade, swartegreene leaves, spread upon the ground, almost lyke the leaves of Plantayne, but thicker, and blacker: the stalke riseth up, from the middest of the leaves of two cubites long, set full of smaller and sharper leaves, the whiche at the toppe divideth and parteth itself into many small branches, upon the whiche groweth many littell floures, very small and yellow, and after them long broade huskes, like littell tunges, greene at the first and afterward blackishe, in whiche the seede is conteyned. The roote is white, single and straight, and without any great store of threeds or strings.

The wilde is very like to the garden Woad, in leaves, stalke, and making, saving that the stalke is tenderer, smaller and browner, and the huskes more narrow, otherwise there is no difference betwixt them.

The Place

Garden Woad is sowen in divers places of Flanders, & Almaigne, in fertill & good grounds. The wilde groweth of his owne kinde in untilled places.

The Tyme

Both do floure in May and June.

The Names

This herbe is called in Greeke ἰσάτις: in Latine also *Isatis*, and *Glastum*, of the late writers *Guadum*, and of some *Luteum herba*: in English Woad, or Pastel: in French *Guesde* or *Pastel*: in Spanish also *Pastel*: in Italian *Guado*: in high Douche, Weidt and Waydt: in base Almaigne Weedt.

The Nature

Garden woad is dry without any sharpnesse. The wilde dryeth more, and is more sharpe and byting.

The Vertues

Garden or sowen Woad, brused is good to be layde upon the woundes of mightie strong people, whiche are used to dayly labour and exercise, and upon places to stop the running out of bloude, & upon fretting ulcers, and rotten sores.

It scattereth and disolveth all colde empostumes being layde thereupon.

The wild woad resisteth moyst and flowing ulcers, and consuming rotten sores, being layde thereupon: but against the other grieffes, for which the garden Woad serveth, it is of lesse strength, and serveth to smal purpose, bycause of his exceeding sharpnesse.

The decoction of wilde Woad dronken, is very good for such as have any stopping or hardnesse in the Milte or Splene.

VI. CASTORE DURANTE, *HERBARIO NUOVO*, 1585, p. 213

Cultivated Woad [1]

(*Glasto Domestico*)

Isatis stops haemorrhages, and is useful in cases of St. Anthony's Fire. It also is beneficial in diseases of the spleen, and heals both rodent ulcers and recent wounds; it also disperses tumours.

Name

Greek ἴσατις ἥμερος. Lat. Isatis dom. and Glastum. It. Guado domestico. Germ. Vueid. Sp. Pastel. Fr. Gueda and Pastel.

Description

Cultivated woad, which dyers use to dye wool produces leaves which resemble those of the plantain, but are somewhat thicker and darker. Its stem reaches the height of two cubits and bears numerous small delicate yellow flowers.

Locality

It is cultivated in great quantities in the district round Rieti for use in the wool trade, as well as in many other parts of Umbria, except in Gualdo, my own country, where it is neither cultivated nor gathered. Those persons therefore who think that the name Gualdo is derived from Guado are in error, unless of course they are referring to some other Gualdo not in the Ferrara province.

[1] This extract from the Italian Herbal is confined to passages giving fresh information. The other passages are practically a repetition of statements in earlier Herbals.

Virtues

Cultivated woad has a most powerful desiccating action, which it exerts without causing irritation; it is moreover bitter and astringent.

The decoction mixed with wine and drunk is beneficial in cases of induration of the spleen. Further, the leaves made into poultices, tend to heal abscesses and to close all kinds of fresh wounds; they also check haemorrhage and arrest the horrible inflammatory processes which are apt to spread through the body in cases of long-standing and foul ulcers. The indigo used by painters is obtained by mixing the purple scum from the woad vat with a little vinegar and with the juice of ripe elder seeds for four or five days. It is then dried over the fire.

Wild Woad

(*Glasto Sylvatico*)

Isatis sylvestris or wild woad arrests haemorrhage, has a desiccating action and relieves disorders of the spleen. It benefits moist and foul ulcers and checks their growth.

Name

Greek. ἰσάτις ἄγρια. Lat. Isatis silvestris. Ital. Guada Sal. Ger. Vuilde, vueidt. Fr. Pastel sauvage.

Description

Wild woad resembles the cultivated variety; the latter, however, produces somewhat larger leaves, somewhat like those of the lettuce. It has fine branching somewhat reddish stems, from the summits of which hang numerous pods resembling little tongues, in which

is lodged the seed. It produces reddish flowers which turn yellow and are very delicate and small.

Locality

It grows in country districts, in pastures and uncultivated places.

Virtues

It has an extremely pungent taste, as is well known to woadmen. Moreover, it has a much more desiccating action than has the cultivated variety; it has the same healing action as has the cultivated kind. In the form of a beverage or a plaster it relieves the disorders of the spleen, and is more efficacious than cultivated woad in cases of oedematous and foul ulcers.

VII. J. GERARDE, *THE HERBALL*, 1597, p. 394

Of Woade

The description

Glastum or Garden Woade hath long leaves of a blewish greene colour. The stalk groweth two cubites high, set about with a great number of such leaves as come up first, but smaller, branching it selfe at the top into many little twigs, whereupon doe growe many small yellow flowers, which being past, the seede commeth foorth like little blackish toongs: the roote is white and single.

There is a wilde kinde of Woade very like unto the former in stalkes, leaves, and fashion, saving that the stalke is tenderer, smaller, and browner, and the little toongs narrower; otherwise there is no difference betwixt them.

The place

The tame or garden Woade groweth in fertill fields, where it is sowen: the wilde kinde groweth where the tame kinde hath been sowen.[1]

The time

They flower from June to September.

The names

Woade is called in Greeke ἰσάτις: in Latine *Isatis*, and *Glastum*. Caesar in his first booke of the French wars, saith, that all the Britons do colour themselves with Woade, which giveth a blew colour; the thing also Plinie in his 22. booke, chap. 1, doth testifie: in Fraunce they call it *Glastum*, *Woad*, which is like unto Plantaine, wherewith the Britons wives, and their sonnes wives are coloured all over, and go naked in some kind of sacrifices. It is likewise called of divers *Guadum*: of the Italians *Guado*; a word it seemeth wrung out of the word *Glastum*; in Spanish and French *Pastel*: in Dutch *Weet*: in English *Woade* and *Wade*.

The nature

Garden Woade is drie without sharpnesse: the wilde Woade drieth more, and is more sharpe and biting.

[1] The sentence '. . . the wilde kinde groweth where the tame kinde has been sowen' has an important bearing on the question whether Woad was ever really native in this country. Gerarde had obviously no knowledge of it as a wild plant other than as an escape from cultivation; indeed it is never described as such in any of the Herbals. The differences given between Garden Woad and Wild Woad are precisely those met with as a result of the usual deterioration to be observed in a cultivated plant which has escaped.

The vertues

The decoction of Woade drunken, is good for such as have any stopping or hardness in the milt or spleene, and is also good for wounds and ulcers in bodies of a strong constitution, as of countrie people, and such as are accustomed to great labour and hard course fare.

It serveth well to die and colour cloth, profitable to some few, and hurtfull to many.

VIII. J. PARKINSON, *THEATRUM BOTANICUM*, 1640, p. 600

Isatis sive Glastum. Woade

Of this herbe there is accounted two sorts, the one manured, the other growing wilde; yet they are both so like the one unto the other, that it is thought the manuring onely causeth the difference;[1] a third sort I have added to them for the colours sake though most disproportioned in forme.

1. *Glastum sativum.* Manured Woade

Woade that is sowen in fields for use, hath divers large, long and somewhat broad leaves, like unto those of Ribwort Plantaine, but larger, thicker, and of a darker blewish greene colour; from among which ariseth up a strong stalke three or foure foote high, and sometimes more, with divers such leaves set thereon, but smaller up to the top, where it spreadeth into divers branches, at the ends whereof grow small yellow flowers, in whose places come long flattish huskes, or cods like tongues, blacke when they are ripe, and pendulous or hanging downewards, wherein lye the seede, which if it be a little chawed or broken with moysture, will give a blew

[1] Cf. note on p. 237.

colour; the roote is white and long, growing downewards.

2. *Glastum sylvestre.* Wilde Woade

This wilde Woade differeth little from the tame or manured, but that it is smaller, the stalke slenderer, the leaves lesser, and the huske or cods smaller and narrower.

3. *Nil sive Anil, Glastum Indicum.* Indico or Indian Woade

Although *Nil* or *Indico* be not in forme like Woade, yet for the rich blew colour sake I thinke good to make mention of it here with it, not onely to shew you what it is, and how made, but to incite some of our nation, to be as industrious therein as they have been with the former Woade, seeing no doubt but it would bee more profitable.

The Place

The wilde kinde groweth in sundry untilled places and fields in *Germany*, as it is sayd, but the manured is sowen as well in *Germany*, *France*, and *Spaine* as in *Italy* also, in *Umbria* neare unto *Nocera*, as *Matthiolus* saith, where there is a towne called *Guado*, of the Woade that grew there abundantly; and in the *Ilands* of *Terceras* belonging to *Spaine*: some have sowen it in our owne land, but they have founde it to be the cause of the destruction of their Bees; for it hath beene observed, that they have dyed as it were of a Flix that have tasted thereof: it is sayd that in some places they sow their Woade upon the same ground, that afterwards they sowed their Corne, which crop of Woade is three times cut in a yeare, and that these rootes that are not turned up with the Plough will beare seed among the Corne. The Plant whereof the *Nil* or *Indico* is made,

groweth in divers places of the *East Indies*, but especially in *Guzurate*, and the best in and about *Bianie* in the *Mogols* countrey.

The Time

Woade flowreth in *June*, but the seede is late ripe.

The Names

It is called in Greeke ἰσάτις, and *Isatis* in Latine, *Glastum* also and *Guadum* of some, after the Italian word *Guado*, whereby they call Woade. *Caesar* in his first booke, *de Bello Gallico*, maketh mention of *Glastum*, wherewith the ancient Brittaines did colour themselves to seeme the more terrible to their enemies in battaile as it is thought; or that they did then as the Savages of the West Indies doe now delight in such a colour, to paint their naked skinnes therewith. Pliny also speaketh of the Brittaines using of *Glastum* in his 22 Booke and first Chap. but divers doe diversly imagine from whence the word *Glastum* should be derived; some have imagined, that in both those Authors the word *Vitrum* should be read in stead of *Glastum*; because the Germane word Glasse, from whence they thinke *Glastum* is derived, is signified by *Vitrum*; and some also would turne *Vitrum* into *Nitrum*; but *Nitrum* is not for such use, for it is yet very rare or scarse seene of any with us: the Arabians call it *Dili*, *Deligi*, *Chate*, *Chatis*, *Alchat*, *Alden*, or *Adhlen*, or as Avicen in his 512 Chap. saith *Nil*.[1]

The Vertues

The faculties of Woade are binding and very drying, and somewhat bitter withall, but not sharpe, and the wilde sort much more, as usually all wilde herbes

[1] Here follows a long but scarcely relevant account of indigo.

exceede the tame in the properties, and therefore it resisteth putrefaction and preserveth therefrom more than the tame: the tame stancheth bleedings of all sorts, eyther inward or outward, eyther upwards or downewards more than the wilde: the decoction of the manured, but much more of the wilde sort, made with wine and drunke, helpeth the hardness of the spleene; and if the region thereof be outwardly fomented therewith also, it will doe the more good: the manured is much more profitably used for all greene wounds then the wilde, quickly to soder up the lippes of them, and no less profitable it is to represse the corroding and malignant qualities of fowle and eating Ulcers, foule Cancers and the like, and healeth them also; as also allayeth and discusseth all hot inflammations, impostumes,[1] *S. Antonies* fire, hard tumors or swellings . . . the juice of Woade preserved all the yeare, or the distilled water of the herbe, worketh the same effectes that eyther the decoction or the powder of the dryed herbe doth.

IX. N. CULPEPER, 1652, p. 236

Description

It hath divers large leaves, long and somewhat broad withall, like to those of the greater Plantan, but larger, thicker, of a greenish colour, and somewhat blue withall: from among which leaves riseth up a lusty stalk, three or four foot high, with divers leaves set thereon; the higher the stalk riseth the smaller are the leaves, at the top it spreadeth into divers branches, at the ends of which appear pretty little yellow flowers, and after they pass away like other flowers of the field, come hulks, long, and somewhat flat withall, in form they resemble

[1] Abscesses.

a tongue, in colour they are black, and they hang bobbing downwards. The Seed contained within these hulks (if it be a little chewed) gives an Azure colour. The Root is white and long.

Place

It is sowed in fields for the benefit of it, where those that sow it cut it three times a year.

Time

It flowereth in June, but is long after before the Seed is ripe.

Virtues and Use

Some people affirm the plant to be destructive to Bees, which if it be I cannot help it; they say it possesseth Bees with a Flux, but that I can hardly believe, unless Bees be contrary to all other Creatures. I should rather think it possesseth them with the contrary disease, the Herb being exceedingly drying and binding. However, if any Bees be diseased thereby, the cure is to set Urine by them, but set it in such a Vessel that they cannot drown themselves, which may be remedied if you put pieces of Cork in it. I told you before the Herb was drying and binding, and so drying and binding that it is not fit to be given inwardly. An Oyntment made thereof stancheth bleeding: a Plaister made thereof and applied to the region of the Spleen (and I pray you take notice that the Spleen lies on the left side) takes away the hardness and pains thereof: The Oyntment is excellent good in such Ulcers as abound with moisture, and takes away the corroding and fretting humours: it cools inflammations, quencheth S. Anthonies fire, and stayeth Defluxions of bloud to any part of the body.

X. J. PECHEY, *THE COMPLEAT HERBAL OF PHYSICAL PLANTS*, Ed. II, 1707, p. 347

WOAD

(*in Latin Glastum Sativum*)[1]

It has long leaves of a bluish green colours the Stalk grows two Cubits high, set about with a great number of such leaves as come up first, but smaller, branching itself at the top into many little twigs, whereupon grow many small yellow flowers: which being past, the Seed comes forth like little blackish Tongues: the Root is white and single. It grows in fertile Fields, where it is sown; it flowers from June to September. Woad is astringent, bitterish, and acrid. Indigo is of the same taste and vertue. Woad abounds in a volatile Salt, and is a good Hepatick in the Jaundice.[2] *Wedelius* makes a volatile Salt of it without Fire. It belongs to the Cresses by its Cods and Taste, and may be plac'd with *Chelidonum majus*. The flowers smell like Cresses.

XI. W. SALMON, *THE ENGLISH HERBAL*, 1710, p. 1272

OF WOAD, *Garden and Wild*

i. *The Names*

It is called in Greek ἰσάτις: in Latin *Glastum* and *Isatis* also; and by some *Guadum*: and in English, *Woad*.

[1] The last two sentences of this extract are of particular interest as they give the first indication of any recognition of the proper position of Woad in a Natural Classification. We have seen it compared to *Cynoglossum*, Endive, and Lettuces and classed with Indigo because of its property of producing a blue dye. Now for the first time its relationship with the cresses is recognized 'by its Cods and Taste', and it is ranked among the *Cruciferae*. An error is still made in associating it with *Chelidonium majus* which belongs to the Papaveraceae.

[2] The yellow colour of the woad flowers probably led to the plant being prescribed in jaundice, in accordance with the 'Doctrine of Signatures'.

ii. *The Kinds*

We have but two kinds hereof, *viz.* 1. *Glastum Sativum, Isatis Sativa*: Our Manured Woad. 2. *Glastum Sylvestre, Isatis agria*: Wild Woad.

iii–iv. *The Description*

The First, or our Common Manured Woad. Its root is white and long, growing downwards: it has divers large, long, and somewhat broad leaves, not much unlike to those of Ribwort Plantane,[1] but larger, thicker, and of a darker blewish color. From among which rise up, one or two strong Stalks 3 or 4 Feet high, and sometimes more, with divers such Leaves set thereon, but smaller as they approach up to the top; where they spread themselves out into many Branches: at the ends thereof grow small yellow Flowers; in whose places come long flattish Cods or Pods like Tongues, black when they are ripe, and pendulous, or hanging downwards, wherein lye the seed, which if it be a little chewed or broken with moisture, will give a blew color.

The Second, or Wild Woad. It is very like unto the former, in its Root, Stalks, Leaves, manner and fashion of growing, saving that the Stalk is slenderer, tenderer and browner, the Leaves lesser, and the Husks or Cods not so great, and narrower, and the whole Plant smaller.

v. *The Places*

The Manured Woad is sown in Gardens, and whole Fields are Sown with it in England, France, Germany, Italy, and Spain, as also in the Islands of Terceras,

[1] *Plantago lanceolata.*

belonging to Spain. The Wild in Fields and Untill'd Places in England, Germany, &c., where the Manured has been Sown.

vi. *The Times*

They Flower in June and July, and the Seed is late Ripe, *viz.* in September or October.

vii. *The Qualities*

The Manured Woad is hot in the first Degree, and dry in the second, bitter withal, but not sharp. The Wild is as hot, but more drying, *viz.* in the third Degree, and is more sharp and bitting, exceeding the Manured in all its properties; they are Abstersive, Astringent, and Vulnerary.

viii. *The Specification*

It is good against the obstruction, Pain, and Tumor of the Spleen; and is proper for the Cure of simple Green Wounds, and Ulcers.

ix. *The Preparations*

You may have therefrom, *viz.* from the Herb, 1. A Liquid Juice. 2. A Decoction in Wine or Water. 3. A Balsam. 4. A Distilled Water. 5. A Pouder of the Herb.

x. *The Virtues*

The Liquid Juice. It is binding and very drying, resists Putrefaction, stops Bleedings of all sorts, whether inward or outward, by the Mouth, Nose, Fundament, or private Parts; and therefore is profitable to stop the overflowing of the Terms and Loches in Women: used to Green Wounds, it sodders up their Lips and quickly heals them; and is no less profitable to cleanse and

correct the putridity and malignity of old running Sores, and eating Ulcers, rebellious Fistulas, pernicious Cancers, and the like, being outwardly applyed and inwardly taken, from 1 Spoonful to 6, (according to the advice of the Physician) Morning and Night, mixt with a little Wine, or Wine and Water, or other fit Vehicle; and so taken, it is good to open the Spleen, ease its Pain, and to discuss all hot Tumors thereof.

The Decoction in Wine. It has all the former Virtues, tho' not altogether so powerful, and therefore may be taken Morning and Night, from 3 to 6 ounces; and outwardly applyed to simple Green Wounds, old running sores, foul Ulcers and Fistulas, to wash and foment them therewith, it Absterges or cleanses, and induces their healing: but particularly helps the hardness of the Spleen being Drank, and the Region thereof being also fomented therewith.

The Balsam. It is of singular use (being applyed) for the curing of simple Green Wounds, and cleansing, incarnating, drying and healing, of old running Sores, malign and putrid Ulcers, and rebellious Fistulas, &c.

The Distilled Water. It has all the Virtues of the Juice or Decoction; but as it is much weaker, so it must be taken in much greater quantities, and is best to be used mixed with either the Juice or Decoction.

The Pouder of the Herb. It may be given from half a Dram to a Dram, Morning and Evening in a Glass of Wine, or Wine mixed with the Distilled Water, or in the Decoction aforementioned, to all the purposes said. It is good against the Bloody-Flux, as also all other Fluxes of the Belly, or Defluxions of Humors upon any part, vehement Catarrhs, and the like.

The Decoction in Water. It is used by Dyers to Dye Cloth, Wooll, Yarn, &c. of a blew color, by Boiling the matter to be dyed therein.

XII. J. HILL, *THE USEFUL FAMILY HERBAL*, 1754, p. 388

WOAD

Although the Dyers are the People, who pay most regard to Woad, and for whose Use it is cultivated, it has Virtues that demand for it a great deal of Respect in Medicine. The Top of the Stalks, before the Flowers appear, contain the greatest Virtue, and they are best fresh. They are to be given in Infusion, and they are excellent against Obstructions of the Liver, and Spleen; they work by Urine, and so take Effect; the Use of this Infusion must be continued a considerable Time. These are Disorders that come on slowly, and are to be slowly removed.[1]

The herbals referred to above may be regarded as typical examples, but by no means exhaust the list.[2] Further details will be found in the following:

L. Fuchs, *Neues Kräuterbuch*, 1543, c. 125.

H. H. Bock, *Kräuterbuch*, 1546, p. 98.

A. Caesalpinus, *De Plantis*, 1583, viii, p. 358.

P. Tournefort, *Histoire des Plantes qui naissent*, &c., 1698, p. 342.

The study of these herbals throws light on the evolution of the history of botany. It is, however, in connexion with the prescription of woad in the treat-

[1] This extract only deals with that portion of the Herbal which refers to woad in therapeutics.

[2] A valuable bibliography of English and Foreign Herbals is given by E. S. Rohde, *The Old English Herbals*, 1922, pp. 189 f.

ment of disease that they are of special interest. To this subject Ch. xv will be devoted.[1]

[1] The most recent Herbal that refers to Woad in therapeutics is that by F. Müller, *Das Grosse Illustrierte Kräuterbuch*, 1928, p. 731, in which we read: 'woad . . . if ground down, smells very much like black radish and has a bitter taste like cress. The juice of the boiled leaves serves as a remedy against diseases of the spleen. The crushed leaves can be used externally as a remedy against swellings, ulcers, wounds and bleeding. An oil similar to linseed oil can be extracted from the seeds.'

CHAPTER XV

WOAD IN THERAPEUTICS

IT will be convenient to arrange the subject of this Chapter under the following headings:

A. WOAD AS A DRUG IN GREEK AND ROMAN TIMES.
B. WOAD AS A DRUG IN THE MIDDLE AGES.
C. DISEASES FOR WHICH WOAD WAS USED.
D. DISAPPEARANCE OF WOAD FROM THE PHARMACOPOEIA.

A. WOAD AS A DRUG IN GREEK AND ROMAN TIMES

The use of woad in therapeutics goes back to classical times, and has persisted during many centuries, the drug being a trusted remedy both for diseases and for surgical disorders.

Hippocrates (?460 B.C.) refers to woad in his chapter on 'Ulcers':

'Where there is danger of erysipelas seizing the ulcers, the leaves of woad are to be pounded and applied raw in a cataplasm along with linseed, or the linseed is to be moistened with the juice of ? strychnos or of woad, and applied as a cataplasm.'[1]

Pliny (A.D. ? 23–79) thus refers to Isatis:

'A third sort of lettuce coming up in the woods is named otherwise Isatis. The leaues whereof being likewise beaten together with Barley-meale or floure aforesaid, cureth green wounds.'

'A fourth kind there is besides of wild lettuce, named Glastum, i.e. woad, wherewith diuers vse to colour their wooll. It might be likened to the wild Dock for the leaues, but that they be more in number, and of a blacker green withall. This

[1] *Works of Hippocrates*, ed. by F. Adams, 1849, ii, p. 799.

hearb stancheth bloud. It represseth and cureth the fierie and eating tettars, the cankerous and filthy vlcers which run and spread ouer the whole and sound parts: also it dissolueth swellings before they gather to an head, and tend to suppuration. The root or leaves thereof be good against S. Anthonies fire, applied in a cataplasme or liniment. It is a singular remedy also for the swelled and puffed spleene; and thus much for their properties in particular, respectiue to each seueral kind: but to speak generally of them all that grow wild, they agree all in this, that they be white; that their stem growes otherwhiles to the height of a cubit; that both it and the leaves be rough in handling.' [1]

Galen (b. A.D. 131) gives the following description of woad:

'*Woad* (Isatis). House woad (Isatis domestica) which is used in dyeing, possesses marked desiccative but not corrosive qualities; it is both bitter and astringent. It heals up wounds of the body in vigorous persons, even though situated in the heads of muscles. It may also usefully be applied to those parts of the body from which there is discharge of blood. It exercises a wonderful influence in checking and controlling swellings and tumours, and is exceedingly effectual in the case of malignant ulcers, even though putrefying and even though they have eaten away the tissues and have thus produced erosions. If at any time it should appear to be too potent in action in the treatment of any particular disease, it will be necessary to mix with the bruised leaves either bread or barley or wheat flour or else pearl barley, according as the circumstances of the case demand. On the other hand Isatis sylvestris is somewhat strong in taste and violent in action. Hence it has a more powerful effect as a desiccant than Isatis domestica and is of almost greater potency in the treatment of moist gangrenous conditions. In other respects, however, its action is not so good; its desiccant

[1] C. Plinius Secundus, *The Historie of the World: commonly called the Naturall History*, ed. by P. Holland, 1634, p. 45. Pliny appears to have confused woad with lettuce, two plants whose leaves bear some resemblance to each other.

properties are too marked; in this way irritation is set up, and there is a tendency for phlegmonous conditions to be aggravated. On the other hand, on account of its strength it should be useful in the treatment of diseases of the spleen, as the other species has so far failed to be of benefit in this respect.[1]

In the Syriac Book of Medicines, probably dating from the early centuries of the Christian era, woad is recommended for ear trouble in the following passage:

'If there be in the ear a sore which is inflamed, or an angry boil and it causes pain, the following medicines are beneficial. Take vinegar and oil of roses, heat them and pour into the ears, or dip the woolly fibre of the woad plant ἴσατις [into the mixture] and put into the ears.'[2]

B. WOAD AS A DRUG IN THE MIDDLE AGES

The extracts from mediaeval herbals given in the preceding chapter contain many references to the use of woad in disease and need not be repeated here. Amongst its other virtues woad is described as antiseptic, astringent, febrifuge, haemostatic, and as an excellent vulnerary. The doses likewise are occasionally mentioned.

Woad is also mentioned in early Pharmacopoeias. Thus the *Pharmacopoeia Londinensis*, or the London Dispensatory, 1654, has two references to woad. The root is said to possess 'great physical virtues', while on the other hand the herb woad is described as 'drying and binding'. 'The side being bathed with it, it easeth Pains in the Spleen, and cleanseth filthy corroding gnawing ulcers.'[3]

[1] Galenus, *De simplicium medicamentorum temperamentis ac facultatibus*, vi, Ch. lx. *Opera Omnia*, ed. C. G. Kühn, 1826, xi, p. 890.

[2] *Syriac Book of Medicines*, ed. by E. A. W. Budge, ii, p. 113.

[3] *Pharmacopoeia Londinensis*, 1654, p. 12. It is worthy of note that two herbalists who wrote in the 17th century, viz. Parkinson and Culpeper, state that woad is injurious to and causes a flux in bees. On the other hand, woad was considered beneficial to diseased sheep. 'The winter crop (of woad) is of good worth, excellent for sheep,

The Pharmacopoeia of the Royal College of Physicians of Edinburgh, 1744, p. 10, also refers to woad, but gives no details as to its value in therapeutics. The herb Glastum (*Isatis*) is merely arranged amongst the Simplicia or simples, by which was meant that the herb possessed some special virtue apart from any other drug, and therefore was a simple remedy.

In the 18th century Lemery, in his dictionary of drugs, recommends woad as a vulnerary, desiccative and astringent. The crushed leaves are also used as a remedy for intermittent fever, if a handful is applied at the time of a rigor.[1]

A few years later James in his medical dictionary also refers to woad:

'Woad is restringent (i.e. astringent) and drying and sometimes us'd to stop both inward and outward bleedings. It is, also, applied with good success, for Ruptures and Strains and to strengthen the Joints. It is an ingredient in the Emplastrum ad Hernian. It is esteemed an excellent vulnerary.'[2]

The following synopsis of the principal uses of woad as a remedy may be helpful, and allow a rapid survey of the whole subject.

C. DISEASES FOR WHICH WOAD WAS USED

Disease.	Form of Remedy.	Authority.
	Classical Writers.	
Ear Disease.	Woolly fibres of the plant.	Syriac Book of Medicines.
Haemorrhage.	Part of plant not stated.	Pliny, Galen.
,,	Leaves.	Müller.

conceived good against the rot, or will recover a rotten sheep, and also it will maintain them well.'—W. Blith, *The English Improver Improved*, 1653, p. 227.

[1] N. Lemery, *Dictionnaire Universel des Drogues Simples*, 1733, p. 458.

[2] R. James, *A Medicinal Dictionary*, 1745, ii. This work seems one of the latest in which woad was recommended in disease.

Disease.	Form of Remedy.	Authority.
	Classical Writers.	
St. Anthony's Fire (Erysipelas).	Cataplasm or liniment made from root.	Pliny.
Splenetic Disease.	Part of plant not stated.	Pliny, Dioscorides, Galen.
,,	Juice.	Müller.
Tumors, Ulcers.	Cataplasm made of pounded leaves, linseed meal, &c.	Hippocrates, Pliny, Galen, Müller.
Vesicular Eruption.	Part of plant not stated.	Pliny.
Wounds.	Pounded leaves mixed with barley meal.	Pliny, Galen.
	Mediaeval Herbalists.	
Angina.	Volatile salt.[1]	Ray.
Cancers, Tumors, Ulcers.	Plaster made from the leaves.	L'Obel.
,,	Crushed leaves mixed with bread and used as a plaster.	L'Obel.
,,	Leaves used as a plaster.	Lyte.
,,	Leaves used as a plaster.	Durante.
,,	Decoction of the leaves, distilled water, juice of the herb or powdered herb.	Parkinson.
,,	Ointment made from leaves.	Culpeper.
,,	Juice of the leaves or decoction in wine for external use.	Salmon.
,,	Balsam made from leaves for external use.	Salmon.
,,	Leaves mixed with distilled water; best mixed with the juice or decoction.	Salmon.
Catarrh.	Powdered herb mixed with wine or as a decoction.	Salmon.
Haemorrhage.	Plaster made with the leaves.	L'Obel.
,,	Plaster.	Lyte.
,,	Plaster.	Durante.
,,	Juice, distilled water, decoction or powder.	Parkinson.
,,	Ointment.	Culpeper.

[1] This probably refers to the ammoniacal gases evolved during the fermentation of woad.

Disease.	Form of Remedy.	Authority.
	Mediaeval Herbalists.	
Inflammation.	Decoction made with wine and drunk.	Parkinson.
Jaundice.	Volatile salt.	Pechy.
Menorrhagia.	Liquid juice.	Salmon.
Scurvy.	Volatile salt.	Ray.
Snake-bite.	No details given.	Cockayne.[1]
Splenetic disease.	Drink or ointment.	L'Obel.
,,	Decoction to be drunk.	Lyte.
,,	Drink or plaster.	Durante.
,,	Decoction to be drunk.	Gerarde.
,,	Decoction made with wine to be drunk, combined with fomentations.	Parkinson.[2]
,,	Plaster.	Culpeper.
,,	Juice or decoction in wine to be drunk combined with fomentations.	Salmon.
St. Anthony's Fire (Erysipelas).	Plaster made with the leaves.	L'Obel.
,,	Leaves.	Durante.
,,	Juice, distilled water, decoction or powder.	Parkinson.
,,	Ointment.	Culpeper.
Wounds.[3]	Plaster made with the leaves.	Lyte.
,,	Plaster made with the leaves.	L'Obel.
,,	Plaster made with the leaves.	Durante.
,,	Decoction made with the leaves.	Gerarde.
,,	Decoction, distilled water, powder of the dry herb or juice.	Parkinson.
,,	Ointment.	Culpeper.
,,	Juice or decoction in wine applied outwardly.	Salmon.
,,	Balsam applied outwardly.	Salmon.

[1] *Leechdoms*, ed. by O. Cockayne, 1865, i, p. 31.

[2] Parkinson and other herbalists attribute more therapeutic value to wild than to cultivated woad.

[3] In *Leechdoms*, ed. by O. Cockayne. 1865, ii, p. 95, heads of woad and of nettle pounded, boiled in butter, strained, and with the addition of salt, are recommended as a wound salve.

Disease.	Form of Remedy.	Authority.
	Pharmacopoeias or Dictionaries.	
Haemorrhage.	Root said to possess great physical virtues.	Pharmacopoeia Londinensis.
Hernia.	Plant used as a cataplasm.	James's Medical Dictionary.
Intermittent Fever.	Crushed leaves.	Lemery.
Joints, Injuries to.	Part of plant not stated.	James's Dictionary.
Liver, obstructions of.	Infusion made from top of stalks.	Hill.
Splenetic disorders.	Root said to possess great physical virtues.	Pharmacopoeia Londinensis.
„	Infusion made from stalks.	Hill.
Ulcers.	Part of plant not stated.	Pharmacopoeia Londinensis.
Unspecified Disease.	Plant used as a simple.	Edinburgh Pharmacopoeia.

D. DISAPPEARANCE OF WOAD FROM THE PHARMACOPOEIA

In modern times woad has wholly disappeared from text-books of medicine and works on therapeutics, and has been relegated to the refuse heap of superseded remedies. The question may well be asked how it comes about that a drug so widely prescribed as a remedy for internal as well as external disorders, for medical as well as surgical ailments, for acute as well as chronic diseases, should have remained in favour during so many centuries.

The reply is that the cures attributed to woad were in reality instances of faith-healing, that the prescriptions of the drug benefited by the expectation of relief aroused in the mind of the patient. This psychical result is well known to be associated with almost every therapeutic agent that is recommended by a physician

of commanding personality and supported by venerable historical traditions.

It is worthy of notice that the therapeutic use of woad has been singularly free from mystic rites or charlatanism, such as were in common use with other herbs.[1] Its administration was based on its supposed virtues, and was uncontaminated by astrological influences. Woad was never employed as an amulet or tied on to the patient with 'red wool', or associated with *paternosters*, *ave Marias*, or puerile formalities.[2]

During the 18th century a great advance took place in all the sciences relating to medicine. The spirit of inquiry led to the testing of plants that had been used as remedies in disease and to exact observations as to their real value. The result has been that many plants that had enjoyed an honoured place in the *armamentarium medici* were proved useless. They have therefore been relegated to obscurity and have been replaced by more valuable ones. Such has been the fate of woad.[3]

[1] Singer, however, points out that woad seems to be associated with native Teutonic magic in very early days. In the 'Lay of the Nine Healing Herbs', taken from the Lacnunga, the word 'wedenan', translated as 'blue', is derived from the same root as woad. This suggests that woad was used by the Anglo-Saxon tribes before they came into contact with the Celtic tribes. Cf. C. Singer, *From Magic to Science*, 1928, p. 149. The 'Lay' will be found in Cockayne's *Leechdoms*, 1864, iii, pp. 30–6.

[2] A possible exception may be found in *Leechdoms of Early England*, ed. by O. Cockayne, 1865, ii, p. 295, where the word 'dye-weed' probably refers to 'woad', and where masses are ordered to be sung over the medicines which will 'preserve himself for twelve months against peril of all infirmities'.

[3] It must not be assumed, by implication from this, that all herbs used in mediaeval medicine have not some of the curative properties attributed to them then by 'Doctrine of Signatures', or otherwise. Modern chemistry has proved the existence of valuable essential soil and other constituents in many herbs of real remedial value.

CHAPTER XVI

THE PROTECTION OF WOAD BY LEGISLATION

THIS subject will be dealt with under the following heads:

A. SUPREMACY OF WOAD AS A VAT DYE.
B. THE ADVENT OF A DANGEROUS RIVAL.
C. PROTECTION OF WOAD BY LEGISLATION.
   (*a*) England.
   (*b*) France.
   (*c*) Germany.
   (*d*) Italy.
D. FAILURE OF PROTECTION.

A. SUPREMACY OF WOAD AS A VAT DYE

For many centuries woad enjoyed an unrivalled supremacy in European dye-works as a blue pigment, and was extensively cultivated in order to provide dyers with this indispensable colour; it had in fact no competitor. Many woad merchants became industrial magnates and accumulated large fortunes from the manufacture and sale of woad.

Even before the geographical discoveries of the 16th century (*c.* 1560) opened up a new commercial route to India *via* the Cape, small quantities of exotic indigo used to reach Europe by way of the Persian Gulf, Bagdad, and Alexandria, but it was not then used as a vat dye, although familiar to artists and miniature painters.[1]

[1] The earliest evidence of the introduction of tropical indigo as a dye comes from Italy, indigo being described at Genoa in 1140 and at Bologna in 1194. The dye reached England in 1274, and France in 1288. In those early days, however, exotic indigo appears not to have been used, at any rate to any serious extent, in dye-works; moreover,

When first employed in the European dye vat, indigo was merely added to woad in small proportions in order to brighten the blue colour obtained from woad, the dye which had hitherto been manufactured on a large scale in England, Germany, France, Italy, and other countries. Towards the end of the 16th century, however, European dyers discovered that indigo was a much more economical dye than woad, while at the same time supplying a richer colour.

B. THE ADVENT OF A DANGEROUS RIVAL

As early as A.D. 1631 was formed the Dutch East India Company, which in course of time imported sufficient indigo into Holland to supply the needs of the whole world. An immense Dutch trade in that dye was thus created, which threatened the industry of the woad growers as well as the trade of the woad merchants of Europe. We cannot wonder, therefore, that as indigo was beginning rapidly to invade the European dye market, and to affect important financial interests, a vigorous campaign was undertaken to check the progress of the new and dangerous intruder. This campaign took the form of a strenuous effort to secure protective legislation in favour of the indigenous dye, and the woad merchants were so successful as to induce various governments to prohibit entirely the use of exotic indigo.

Two other competitors also had appeared on the field, viz. logwood and Brazil wood, and these had also aroused the jealousy of the woad dyers, with the result that the campaign against indigo was extended both to Brazil wood and to logwood.

its long overland journey from India to Europe *via* Bagdad rendered its price prohibitive.

C. PROTECTION OF WOAD BY LEGISLATION

The protective measures took various forms in different countries.

(*a*) *England*

In England an Act of Parliament was passed as early as 1532 (24 Hen. VIII, c. 2) prohibiting the use of Brazil wood. Happily the folly of this legislation was soon realized and the Act was repealed. Doubtless the new dye was found not to be as injurious as had been represented.

Logwood was prohibited in England by Queen Elizabeth, under a very heavy penalty, and all the dye found in the country was ordered to be destroyed. Its use was not permitted till the reign of Charles II.

Indigo the beautiful product of the tropical *Indigoferas*, was also prohibited by Parliament in the reign of Elizabeth; it was denounced as a dangerous drug and described as the 'food for the devil'. An Act was passed authorizing searchers to burn both it and logwood in every dye-house where it could be found, and this Act actually remained in force till the time of Charles II, a period embracing a considerable part of a century.

The following Statute of 1581 indicates the extraordinary efforts made by the State to prevent the use of logwood and other dyes in order to encourage the use of woad:

A.D. 1581. *Statute* 23 *Eliz.*, c. 9

LOGWOOD AND BLOCKWOOD SHALL NOT BE USED IN DYING OF CLOTH, ETC.

Whereas of late years there hath been brought into this Realm of England, from beyond the Seas, a certain

kind of Ware or Stuffe called Logwood, alias Blockwood, wherewith divers Dyers, Clothiers, Hat-makers, and others, have and do die daily, divers broad Clothes, Kersies, Woolls, Pennestones, Bayes, Cottons, Hose-yarn, Hats, Caps, Flannels, Woodmails, Bockadoes, Rashes, Buffins, tuft Mockadoes, and other things, Forasmuch as the colours made with the said stuff called Logwood, alias Blockwood, is false and deceitful, and the Clothes and other things therewith dyed, are not onely sold and uttered to the great deceit of the Queens loving Subjects, within this her Realm of England, but also beyond the Seas, to the great discredit and slander, as well of the Merchants, as the Dyers of this Realm.

For reformation whereof, be it ordained, enacted, and established by the Queen our Soveraign Lady, and by the assent of the Lords Spiritual and Temporal, and the Commons in this present Parliament assembled, and by the authority of the same, That all such Logwood, alias Blockwood, in whose hands soever the same shall be found, after the feast of St. Michael the Archangel next ensuing, shall be forfeited, and openly burned by authority of the Mayor or other Head Officer of the City or Town corporate, or of Two Justices of Peace of the County where it shall be found, and that from and after twenty days after the end of this Session of Parliament, no person of what degree soever he be, shall dye or cause to be dyed, any Cloth, Wooll, or any other of the premises above mentioned, or anything whatsoever with any of the said Ware or Stuff called Logwood, alias Blockwood, upon pain that the Dyer of every such several thing so dyed, shall forfeit the value of the thing so dyed, the one moiety to the use of the Queens Majesty, her Heirs or Successors, and the other moiety

to him that will sue for the same, by action of debt, bill, plaint or information in any Court of Record, in which suit, no essoyne, protection, wager of Law, nor writ of priviledg for the Defendant, shall be admitted or allowed: and the party offending, being thereof convicted, to remain in prison without bail, or mainprise, till he have satisfied the same value.

And where Clothes, Kersies, and Hosen have been dyed with a colour which is commonly called a galled and mathered black, or with a colour commonly called a shoomake and mathered black, which colours, although they carry a shew of a good, true and perfect color of woaded and mathered black and of such as do buy the said colours, either in Cloth, Kersie or Hose, taken so to be notwithstanding in proof and wearing prove contrary to the great deceit of the Queens Subjects, and discrediting of the Cloth and other things so dyed: For reformation whereof, be it enacted, That no kind of Cloth of Clothes, Kersies, Bayes, Frisadoes, broad or narrow, Hosen or other things, being in the nature of Cloth, shall from henceforth be mathered for a black, except the same be first grounded with Woad onely, or with woad and a nele, alias blew Inde, unlesse the madder be put in with shoomake or gallis.[1] And that from and after twenty dayes after the end of this Session of Parliament no person of what degree soever he be, shall dye or cause to be dyed any Cloth or Clothes, or other things abovesaid of what kind or nature soever, mathered for a black, not having a ground of woad onely, or of woad and a nele, alias blew Inde, unlesse the

[1] A nele, blew Inde. These terms refer to anil or tropical indigo. Gall-nuts were introduced as a dye towards the close of the Middle Ages. Shoomake = Shumach or Sumach.

madder be put in with shoomake or gallis, upon pain that the Dyer of every such several thing so dyed shall forfeit the value of the same thing so dyed, the one moiety thereof to the use of the Queens Majesty, her Heirs or Successors, and the other moiety to him that will sue for same, by action of debt, bill, plaint or information, in any Court of Record, in which suit no essoyn, protection, Wager of Law, nor writ of priviledg for the Defendant, shall be admitted or allowed, and the party offending being thereof convicted, to remain in prison, without bail or mainprise, till he have satisfied the same value.

Provided alwayes, That it shall and may be lawful to dye all manner of gall black, shoomake black, alias plain black, wherein no mather shall be used, as heretofore hath lawfully been done: this or anything therein contained to the contrary notwithstanding.

Provided alwayes, that every Dyer that shall after the Feast of Pentecost next ensuing the end of this Session of Parliament, dye any of the said Clothes, Kersies, or Frisadoes, mathered and not woaded, shall before he deliver any of the same forth of his hands, fix a Seal of Lead to every of them, in which the letter M. signifying Mathered, shall be contained, upon pain that every Dyer offending to the contrary, shall forfeit for every yard of the said Cloth, Kersies, Bayes, or Frisadoes, the sum of iii. s. iii. d. And that if any person shall sell any Cloth, Kersies, Bayes or Frisadoes mathered and not woaded, after the said Feast of Pentecost, and shall not first give notice to the buyer thereof that the same is not woaded, shall forfeit also the double value of all such Cloth, Kersies, Bayes and Frisadoes, as he shall so sell: which forfeitures shall be to the party that shall

sue for the same in any Court of Record, by action of debt, bill, plaint, or information, wherein no essoine, protection, or wager of Law shall lie.

The prejudice against indigo subsided much before that against logwood, as is proved by an Act passed in 1726 (13 Geo. I, c. 24).

The following extract from that Act will show that the protection of woad against logwood lasted well into the 18th century:

AN ACT FOR PREVENTING FRAUDS AND ABUSES IN THE DYEING TRADE (1726) (13 Geo. I, c. 24)

I. 'Whereas divers persons within this Realme, using the mystery or Craft of Dyers, have of late used and exercised false and deceitful Ways in Dying Bays and other Woollen Goods black, without using Woad, Indigo or Mather, and for passing off such goods as true mathered Blacks (though falsly dyed as aforesaid), the Corner only thereof hath been dyed red, and a red Rose or other mark, for a true dyed Mather Black, tied up at such Corner, when the rest of the said Bays and Woollen Goods, or great Part thereof, are falsly dyed without Woad, Indigo, or Mather as aforesaid, and such or the like deceitful Practises have been and are used in dying of black Cloths, Bays and other Woollen Goods, to imitate and resemble true woaded Blacks, without using any Woad or Indigo in the dying thereof, and a blue Rose or other Mark for a true woaded Black hath been fixed to the Corner thereof, to deceive the Buyer; and whereas great Deceit hath been practised in the dying of Blues with Logwood instead of Woad and Indigo, or mixed therewith, which Frauds and Abuses

tend to the great Deceit and Hurt of His Majesty's Subjects at home, and to the Discredit and Slander, as well of the Merchants as of the Dyers of this Realm, and the Woollen Manufactures of this Kingdom are thereby greatly disparaged in foreign Parts, For Redress of the Premisses, May it please your most Excellent Majesty, that it may be enacted, and be it enacted by the King's most Excellent Majesty, by and with the Advice and Consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the Authority of the same, that if after the twenty-fourth Day of *June* one thousand seven hundred and twenty-seven, any Person or Persons whatsoever shall, within that Part of *Great Britain* called *England*, *Wales* and *Berwick upon Tweed*, dye or cause to be dyed black or as for black, any Bays or other Woollen Goods, as or for Mather Blacks, the same not being dyed throughout with Woad, Indigo and Mather only, without any other Ingredient or Mixture, giving Tincture or Colour, or shall dye or cause to be dyed black, or as or for black, any Cloths, Long Ells, Bays or other Woollen Goods, as or for woaded Blacks, the same not being woaded throughout, every Person offending in the Premisses shall forfeit and pay for such deceitful and false mathered Blacks as followeth (that is to say).

For every long *Bocking* Bays, containing seventy Yards or upwards, forty-four Shillings.

For every *Colchester* Bays or short Bays, containing thirty-five Yards or upwards, the Sum of twenty-two Shillings, and so in Proportion for any greater or less Quantity of any such Bays, or for any other Woollen Goods falsly or deceitfully mathered or pretended to be mathered as aforesaid.

For every Cloth falsly and deceitfully dyed black without being woaded throughout, containing forty-four Yards or more, the Sum of forty Shillings.

For every Piece of Bays falsly and deceitfully dyed as aforesaid, containing seventy Yards or upwards, thirty Shillings.

For every *Colchester* or Short Bays, containing thirty-five Yards or upwards, twelve shillings.

For every *Perpetuana* or Stuff, falsly and deceitfully dyed as aforesaid, the Sum of four Shillings, and so in Proportion for any other Woollen Goods falsly and deceitfully dyed, and as for woaded Blacks as aforesaid.

II. And be it enacted by the Authority aforesaid, That all Woollen Goods and Manufactures which shall be truly mathered black, according to the Directions of this Act, shall be marked with a red Rose and a blue Rose, and all Woollen Goods and Manufactures which shall be truly woaded black throughout, according to the Directions of this Act, shall be marked with a blue Rose only; and if any Person or Persons whatsoever shall, after the said twenty-fourth Day of *June*, counterfeit or forge, or cause to be counterfeited or forged any of the said Marks, or shall dye, stain, imprint or affix any such Mark or Marks to any of the Woollen Goods or Manufactures aforesaid, falsly and deceitfully dyed as or for Mather or Woaded Blacks as aforesaid, every such offender shall, for every such Offence, forfeit and pay four Pounds for every piece of Goods to which the said Mark or Marks shall be affixed as aforesaid.

III. And be it enacted by the Authority aforesaid, that if after the said twenty-fourth Day of *June* any Person or Persons whatsoever shall use or cause to be used, any Logwood in dying of blue, every such Person

shall, for every such Offence, forfeit and pay the Sum of forty Shillings for every Piece of Cloth so dyed, containing in Length forty-four Yards or more, and twenty-two Shillings for every long Piece of Bocking Bays, containing in Length seventy Yards or more, and twelve Shillings for every *Colchester* or short Bays, containing in length thirty-five Yards or more, and four Shillings for every *Perpetuana* or Stuff, containing in Length twenty-four Yards or more, and so in Proportion for all other Sorts of Woollen Goods dyed blue with Logwood, contrary to this Act.

IV. And for more effectual preventing the Frauds and Abuses aforesaid, and for better Discovery thereof, Be it further enacted by the Authority aforesaid, That all Persons occupying the Trade, Art or Mystery of Dying any Manner of Woollen Goods, Stuffs or Woollen Manufactures whatsoever, within the City of *London* or the Suburbs thereof, or within the Limits of the Weekly Bills of Mortality, or within ten Miles Compass of the same City, shall be subject to the Examination and Inspection of the Incorporate Company of Dyers of *London*; and that it shall and may be lawful to and for the Master, Wardens and Court of Assistants of the said Company of Dyers, by Writing or Writings, or under their Common Seal, to appoint honest and skilful Persons to be Searchers within the Limits aforesaid; and out of the Limits aforesaid it shall or may be lawful for the Justices of the Peace at their General or Quarter-Sessions of the Peace for any County, City, Town or Place, to appoint such Searchers; and it shall or may be lawful for all or any such Searchers to be appointed by the said Company of Dyers, or by the Justices of the Peace as aforesaid, taking to his or their Assistance a

Constable or other Peace-Officer of the Place (who is and are hereby required to be aiding and assisting in the Premisses) at all seasonable and convenient Times in the Day-time, to enter into the Shop, Warehouse or Workhouse of any Person or Persons, or Company or Corporation whatsoever, using or exercising the Trade, Art or Mystery of Dying, or into the Shop, Warehouse or Workhouse of any other Person concerned in the dying of any such Woollen Goods as aforesaid, or fixing such Marks to the same as aforesaid, to search and examine all or any Cloths, Bays, Stuffs or other Woollen Goods dyed or to be dyed black or blue; and if any such Person or Persons shall oppose, hinder or refuse such Search, every such Offender shall, for every such Offence, forfeit and pay ten Pounds.'[1]

The remainder of the Act deals with Recovery of penalties, prosecutions, &c.

(*b*) *France*

A similar agitation against the introduction of tropical indigo occurred in France and was powerfully supported by the rich princes of Languedoc, whose revenues depended on the cultivation of the indigenous dye.

As early as 1598 the woad-growers of Languedoc made urgent representations against the importation of indigo, and as a result the use of that dye was prohibited. Eventually the use of indigo was entirely interdicted.

A few years later (1609) King Henry IV of France actually issued an Edict sentencing to death any person who should be discovered using the deceitful and injurious dye called inde (indigo). Not till 1737 were

[1] Statutes at Large, 1768, v, p. 627.

French dyers allowed to use pure indigo or indigo mixed with woad as they chose.

(*c*) *Germany*

In Germany similar measures were taken forbidding the substitution of woad by foreign indigo, and stringent precautions were resorted to in order to prevent the clandestine introduction of the latter. The main instigators of protective measures were the wealthy woad merchants, who possessed great political influence, and actually designated indigo as 'devil's dye'.[1] Both the Emperor Rudolf in 1607 and the Elector of Saxe in 1650 entirely prohibited the use of indigo; the Emperor banished it as 'an injurious, deceptive, corrosive and diabolical article'.

The following Decree issued at Dresden in 1650 may serve as an example of the protective legislation that was passed in favour of woad:

DECREE OF THE ELECTOR JOHN GEORGE I ISSUED AT DRESDEN IN THE YEAR 1650, ORDAINING THAT ALL CLOTHS AND OTHER FABRICS SHALL BE DYED WITH WOAD AND NOT WITH THE INJURIOUS AND CORROSIVE INDIGO [2]

(*Cod. Aug. Th.* 16, 1521)

By the Grace of God, John George, &c., &c. It is known to each & all of you that our Province of Thüringia has been blessed by the Almighty above all other countries and provinces with the Woad plant, which until the war which did us grievous damage, and

[1] Even as early as 1486 the Chamber of Commerce for Textiles (Weberordnung für den Handel) in Baden prohibited the use of any black paint, unless it included woad. (G. Schmoller, *Strassburger Tücher- und Weberzunft*, 1879, p. 510.)

[2] D. G. Schreber, *Beschreibung des Waidtes*, 1752, App., pp. 9 f.

until unscrupulous merchants introduced the useless and deceptive dye indigo, was cultivated with great benefit to the whole community. Cloths and other fabrics of a good quality were dyed, everyone being satisfied both with their quality and durability. On the other hand there is clear proof that indigo not only readily loses its colour but also corrodes cloths & other fabrics, thus causing serious loss to many worthy persons who do not understand the difference between the two dyes.

In the State Ordinances of H.R.R., issued in the years 1577 & 1594, indigo & other injurious dyes were prohibited under threat of punishment or of confiscation of the dyes. More recently, in 1638, the Roman Emperor, our most Gracious Lord, reissued these beneficent Ordinances & has now promulgated a special Decree (of which a cheap and authorised transcript is enclosed), in the hope that it may resuscitate and promote the prosperity of the valuable Woad Industry.

We therefore command you at the New Year's Market, to publicly proclaim with all possible zeal, & to prohibit under pain of confiscation, the sale of any cloths & other similar articles which are not dyed with Woad, but with other injurious dyes. Such goods are neither to be sold singly nor in bundles, nor cut up. Further, any such cloths or similar articles which have been purchased up to the present, including any which tailors & shopkeepers have not cut up and sold, shall be entirely destroyed between this date and the next Easter Market. Moreover they shall never again be imported into this country. We also publish this express Commination that, if any person shall deal in any such

deceptive dyes or similar wares or import the same, we shall severely punish him according to the terms of the admirable Edict, in status, person & property. We shall also confiscate the said goods, according to the terms stated above, in the full assurance that it is for the general good that we should act with energy in this matter, and proceed against all offenders with the utmost severity. This is our fixed determination.

Dresden, Dec. 31, 1650.

A few years later a police regulation was issued by the Elector Augustus, which announced that as the woad industry had always been regarded as an industry restricted to burghers and villagers, it must not be encroached upon by members of the nobility. Certain members of that class, who had ventured to trade in woad, were threatened with punishment unless they immediately desisted. The crushing of woad leaves in the woad mills was also prohibited on Sundays or Feast Days.[1]

Another Imperial Edict was published at Ratisbon in 1654 prohibiting the use of indigo 'because it injured the woad trade, damaged the fabrics dyed with it and carried money out of the country'. At Nürenberg and Ulm the magistrates went even further and compelled the dyers of that city to take an oath once a year that they would not use indigo. This regulation continued in force until recent times, although it was well known that indigo was an indispensable dye. Indeed in Nürenberg any person that used indigo was threatened with the death penalty. In the great religious festivals at Leipzig, Frankfort on the Main, Frankfort on the Oder,

[1] D. G. Schreber, *Beschreibung des Waidtes*, 1752, Appendixes.

and Naumburg, an attempt was actually made to prohibit the wearing of any clothes that had not been dyed with woad. Schreber gives a series of Imperial Edicts as well as Decrees issued by the Saxon Electors and other authorities whose object was to prohibit the use of 'the corrosive dye' indigo. Even falsehoods were spread abroad in order to support a bad cause. For example, indigo was accused of gradually corroding fabrics dyed with it. Another charge was that tropical indigo increased the weight of 1 lb. of knitting silk to two or three lb. and thus made silk clothes extraordinarily heavy.

LIST OF ORDINANCES

1577 Police Regulations of the Imperial Diet, issued at Frankfort on the Main.[1]
1594 Decree of the Imperial Diet issued at Regensburg.
1603 Do.
1621 Würtemberg Land Regulations (Injurious Dyes).
1650 Decree of the Elector John George I (Injurious Dyes).
1652 Efforts made by Duke Ernest of Gotha both in the Imperial Diet at Regensburg and in the Imperial Court at Vienna to obtain concessions for the cultivation of woad.
1654 Decree of the Emperor Ferdinand III (Injurious Dyes).
1654 Decree of the Elector John George I (Injurious Dyes).
1661 Prohibition of Corrosive Dyes, especially of Indigo.
1664 Prohibition of Indigo by the Government of the Duchy of Würtemburg.

(*d*) *Italy*

Much the same opposition to the introduction of indigo was shown in Italy. The entry of indigo into the Papal States was strictly prohibited.

[1] F. Lauterbach, l.c., p. 65.

D. FAILURE OF PROTECTION

In all the important woad-growing countries of Europe drastic steps were taken to protect the home-grown blue dye against its tropical competitor. Absolute prohibition of the latter, confiscation of supplies, even the death penalty threatened those who infringed the protective laws that were passed.

To those living in modern days such State action appears a glaring example of a short-sighted policy which only a Government that had been influenced by private interests could support. Doubtless certain members of the community were enriched at the expense of the rest of the nation, and the continuance of a well-established industry was temporarily ensured. On the other hand, the country concerned was deprived of a valuable commodity to the detriment of the public weal.

In judging the conduct of the legislature at any period of history regard must always be had to the political economy of the time. We must remember that industry in the Middle Ages was placed under strict regulations, which prescribed both process of manufacture and the materials that were used. We must bear in mind that for centuries woad had been a source of much wealth, that the details of its use in the dye vat were accurately known and applied with great success. The use of a new dye would doubtless have been associated with many failures. The paternal government wished to protect the citizens from the losses that would result from inefficient dyeing.

Generally speaking, the legislation that was passed in various States in order to protect the indigenous dye

did something to postpone its collapse. In Germany, however, legislation was far from universal in its application, owing to the number of small States, and to a great extent was disregarded by the commercial community.

As examples of the lack of universality in the application of protective legislation may be mentioned the fact that in Hamburg dyers were using indigo as early as 1610, while Silesia was at the same time importing large supplies of the same dye. Even in Thüringia, the principal centre of woad cultivation in Germany, indigo could be purchased without police interference.[1] At the beginning of the 17th century more than twenty firms sold indigo in Leipzig, while the records of the Stottenheim Company at Erfurt prove that even some woad merchants themselves traded with indigo. Under these circumstances the prospect of any successful resuscitation of the woad industry became more and more gloomy.

Political economists of to-day who cavil at the mediaeval protection of woad may be reminded that even in modern times examples of political ineptitude and short-sightedness have occurred. A mediaeval economist might retort to his modern colleague *mutato nomine, de te fabula narratur*!

We need not go back many years in history to discover examples of political ineptitude. Suffice it to recall the reluctance of my Lords of the Admiralty to replace the 'wooden walls' of England by ironclads; the proposal made in the early days of railways that Parliament should limit their speed to eight or nine miles an hour; the

[1] When indigo was first introduced dyers merely added small quantities of the new dye to the woad vat. By degrees larger quantities were employed, until after the beginning of the 19th century indigo entirely displaced the use of woad as a source of dye.

injury done to the colonies by bounties on beet-sugar; the law which classified motor-cars with traction engines, and required them to be preceded by a man carrying a red flag! Alas! it seems the heritage of humanity to jump to foolish conclusions, which might be avoided by common sense and patience.

The success of protection, however, was only temporary. The superiority of exotic indigo over the indigo which could be extracted from woad in time became known both to the public and the dyers, and in spite of legislation the prosperity of the great woad industry rapidly declined. Its death will form the subject of the last chapter.

CHAPTER XVII

'WOAD' IN PHILOLOGY

THE subject of Woad in Philology may be conveniently dealt with under the following headings:

A. 'WOAD' IN THE GERMANIC LANGUAGES.
B. 'WOAD' IN PERSONAL AND PLACE-NAMES.
C. THE *CARTULARIUM SAXONICUM*.
D. POST-CONQUEST VARIANTS OF 'WOAD'.
E. DIALECTS OF 'WOAD'.

A. 'WOAD' IN THE GERMANIC LANGUAGES

The word woad, OE. wād (*Isatis tinctoria* L.), occurs in all the Germanic languages, except Old Norse, and has the following cognates:[1]

Lat. vītrum, 'blue colour', later *glass* or *glastum*. Gk. ἰσάτις (Fit-σάτις)='Woad': Gothic wizdila.[2] OHGerm. weit. Germ. waid. Dutch weeda. OE. wād. Mod. Eng. woad. Fr. guède. It. guado. Sp. gualda. Welsh llysiau'r or mêl y cŵn. Russ. vajda. Czech vejt.[3]

Dr. Rendel Harris has attempted to solve the problem of the relation of the Greek word *Isatis*, or, if we add the digamma (w) *Fisatis* or *Wisatis*, and the Latin word

[1] An admirable summary of the philology of 'woad' is given in the *Oxford English Dictionary*, where many details may be found.

[2] 'Isatis quam Gothi wizdilem vocant, tinctores herbam vitrum,' V. Rose, *Anecdota Graeca et Graecolatina*, 1864, ii, p. 117. M. Heyne suggests that we have to do with a root which takes two forms. The first is *wis-*, as met with in ἰσάτις sc. Fισάτις and in the Gothic *wiz-dila*. The second form is *wi* passing into the Latin *vi-trum*, the Old G. *wai-d*, MG. *waidso*, OE. *wād*, E. *woad*. Cf. *Deutsche Hausaltertümer*, iii, p. 242.

[3] Woad was formerly also called sandax or sandix, a name which various herbalists have copied. Cf. Matthaeus Sylvaticus, *Liber Pandectarum*, 13th-14th century, Ch. 621.

vitrum to the word *woad* or *wād*. He tabulates the forms in the following way:

Greek.	*Latin.*	*French.*	*German.*	*Dutch.*	*English.*
Isatis	Vitrum and Guesdum	Waisde Waide Guède	Waid OHG. Weid	Weed	Woad OE. Wād

In the OE. word *wād* he suggests that the sibilant s, as it occurs in the Gothic *wizdila* and the Latin *guesdum* and the French *waisde*, has been dropped out. This, if replaced, would give an old form *wasd* or *wads* for *wād*.

This already gives an approximation of the various forms. The chief remaining difficulty is the absence from the Greek of a dental, such as is found in Latin and British. If this dental, which Dr. Harris supposes to have dropped out and which in the language of philology would be called a lost vocable, is replaced we obtain a primitive form *Witsatis* or *Widsatis* as the root of all the above-mentioned names.

Finally a connexion is traced between *Witsatis* and the Egyptian word *watchet*=green, and the English name-place *Watchet*; this suggestion is however much more problematical. [Besides there is Datchet. A.R.H.]

B. 'WOAD' IN PERSONAL AND PLACE-NAMES

Dr. Harris has collected some evidence of the culture of woad by the ancient Britons as revealed by (*a*) Place-names; (*b*) Personal names derived from place-names; (*c*) Personal names independent of place-names.[1]

Under the first heading he includes *Wadbury* and *Wadsworth*; possibly also *Wadborough*[2] in Worcestershire and *Watchbury* in Warwickshire belong to the

[1] Fuller details will be found in Dr. Harris's Essay, *A Primitive Dye-Stuff*, 1927, pp. 9 f.

[2] There is a *Whadborough Hill* in Leicestershire and that is a Celtic hill-fortress, used later by the Romans. If cognate it suggests a purely

same group. *Glastonbury* may perhaps derive its first syllable from *Glastum*, the late Latin name for *woad*. At any rate we know that large revenues were derived by Glastonbury Abbey from the cultivation of woad. Under the second heading may be placed the personal name *Wadsworth*, from which the name *Wordsworth* is derived; *Wadham* [1] probably also belongs to this group. Under the third heading falls *Wadman*, made famous by the scene in Lawrence Sterne's *Tristram Shandy* and by Leslie's picture in the National Gallery.

Apart from glosses the following references occur in OE. (Anglo-Saxon):

Genim wades croppan, 'take shoots of woad'.[2]

(Wād) Thid næddran slike (woad), 'for bite of adder'.[3]

Of wād vel haewenre deage ex hyacintho, 'from woad or blue dye'.[4]

Man mæg . . . on hærfeste wād spittan, 'In autumn woad may be dug with a spittle'.[5]

The following extract is taken from the work on *Place-Names of Worcestershire* by Mawer and Stenton:

WADBOROUGH [6]

Wadbeorgas (pl.)	*Uuadbeorgan* (dat. pl.) [7]
Watberg (*e*)	*Wauberg*
Wadbarewe	*Wadborough*

personal name unconnected with woad, and perhaps rather associated with Woden the deity.

Wadhurst in Sussex (*hurst* being a large wood) rather discounts *wād* being necessarily always connected with woad. (A. R. H.)

[1] *Wadham*, again, suggests that *wād* is a patronymic more often than not. Ham is a home. (A. R. H.)

[2] T. O. Cockayne, *Leechdoms*, 1865, ii. 94–5. [3] Cockayne, l.c., i. 31.

[4] Logeman, *New Aldpelm Glosses* (52); *Anglia*, xiii, p. 29.

[5] *Anglia*, ix, 261, 263. F. Liebermann, *Gerefa*. Possibly wadspitel may mean woaddibbler.

[6] Mawer and Stenton, *Place-Names of Worcestershire*, 1927, p. 220, where further references will be found.

[7] W. D. G. Birch, *Cartularium Saxonicum*, i, p. 262/25. 'On lengtene

'Woad hill' or 'hills'; the form in the OE. charter is in the plural. Cf. *Wadbeorh* in Cutsdean,[1] *Wadbeorgas* in Tredington, *Worcs.*,[2] *Wadlond* in Hallow, *Worcs.*,[3] *Wadleahe*,[4] *Wadleage*,[5] *Waddene* in Odell, *Beds.*,[6] *Woodhill*, *Wilts.*, and *Waddicar*, *Lancs.*[7]

These place-names, all with the same first element, apart from those for which we have only post-Conquest forms, point to the widespread cultivation of woad in OE. times, at least in Worcestershire, Berkshire, and Hampshire.[8]

C. THE *CARTULARIUM SAXONICUM*

The following references to 'Woad' occur in the *Cartularium Saxonicum* (Birch):

(1) 'a meredic in wadberegwe (= woad hill), a beregwe in lihte mēde.' i, 184/36. Grant by King Kenred and King Offa of lands on the banks of the R. Avon, &c., to Homme, Evesham Monastery, Worcs. A.D. 709.

(2) 'þæt þonne on wadbeorgas (= woad hill) of Wadbeorgan.' i, 262/25. (Tredington, Worcs.) *c.* A.D. 757.

(3) 'in clacces wadlond (= woad land).' Grant by King Offa to Worcester of land at Readanhora. i, 304/20. A.D. 774.

eregiam . . . linsed sawan, wadsæd cacswa.' In spring plough . . . and sow linseed and also woadseed. F. Liebermann, *Gerefa*; *Anglia*, ix, 262 (*c.* 1100).

1 Birch, *Cartularium Saxonicum*, iii, 618 (2 from foot).

2 Birch, l.c., i, p. 262/25.

3 Birch, l.c., i, p. 496 (5 from foot).

4 Birch, l.c., iii, p. 506/11.

5 Hemingi Chartularium Eccl.Wigorniensis, 1723, 356.

6 Birch, l.c., iii, p. 292/22.

7 But see my note *supra*. (A. R. H.)

8 Not all these compounds with *wād* or variants refer to woad or its culture, as I have indicated. The prefix is of multiple origin. (A. R. H.)

(4) 'to wadbeorge (= woad hill) sicque of wadbeorge in illum fontem.' i, 315/17. (Bedewinde or Bedwyn, Wilts.) A.D. 778.

(5) 'of þā wad londe (= woad land) in gearri ford.' i, 496 (5 from foot). Grant by King Coenwulf to Deneberht, Bishop of Worcester, of land at Hallow on the R. Severn. A.D. 816.

(6) 'of þam treow on weg gelætan, norðrihtis to waddanyge (= woad?).' ii, 260 (3 from foot). Grant of land at Micheldever, Hants, by King Edward to S. Peter's, Winchester. A.D. 904.

(7) 'quosdam agros qui ab incolis nominantur *Wadland* (= woad land) at Wlfrethingland.' ii, 214/3. Purchase by Wlfelm, Archbishop of Canterbury, of lands at Wadland, &c., Kent. A.D. 923.

(8) 'þæt up on wadham (= woad house).'[1] ii, 354/17. Land at Priscton, Somerset, granted by King Æðelstan to Bath Abbey. A.D. 931.

(9) 'of þam hlince and lang drafae on þonæ hlinc æt wad dænæ (= woad valley).' ii, 409/30. Grant by Æðelstan to Winchester Cathedral of land at Enford, Wilts. A.D. 943.

(10) 'of meos leage on wadleage (= woad district) noðre weardre of wadleage on hremnes geat.' ii, 469 (9 from foot). Grant of lands to Newminster, Winchester, by King Edmund. Pewsey, Wilts. A.D. 940.

(11) 'on waddene uuewarde (= woad valley).' iii, 159 (4 from foot). Grant by King Adwig to Shaftesbury of lands at Iwerne, Dorset, and elsewhere. A.D. 956.

(12) 'þonne to wād leage weste wearde (= woad district).' iii, 290 (5 from foot). Grant of lands by King Eadgar. Great Bedwin, Wilts. A.D. 961.

(13) 'and land (along) þære dīc ēast innon waddene

[1] A sacred type of house or 'home', not a place to store or use for dyeing with woad. (A. R. H.)

(= woad valley).' iii, 292/22. Grant to Winchester by Eadgar of lands at Avington, Hants. A.D. 961.

(14) 'of þan brok' bi merehawe on wadeleighe (woad-lea).' iii, 494/25. Grant by King Eadgar to Glastonbury of land at Sturminster, Dorset. A.D. 968.

(15) 'And land temese on wadleage (= woad district).' iii, 506/11. Land granted to Abingdon Abbey by King Eadgar. Cumnor, Berks. A.D. 968.

(16) 'on ore wade? (= border of woad).' iii, 564 (7 from foot). Grant by King Eadgar of land at Ely, Suff. A.D. 970.

(17) 'X (*sc.* mansi) in Uuadbeorhan (= woad hill).' iii, 585/14. Grant of lands to Pershore Abbey, Worcs. A.D. 972.

(18) 'on þa ealdan dīc of ðaere dīc on wād beorgas (= woad hill) of wād beorgan to þam', &c. iii, 586/25 (same grant). A.D. 972.

(19) 'æt wad beorhe (= woad hill).' iii, p. 590/17 (same grant). A.D. 972.

(20) 'of wad beorhce (= woad hill) on lafercan beorh.' iii, 618 (last l.). Land at Codestune, Worcs. A.D. 974.

D. POST-CONQUEST VARIANTS OF 'WOAD'

Gualdum. MS., R.O., K.R. Customs, 81/1. Gras, *Early English Customs System*, 1918, p. 562.

Oad. W. Blith, *The English Improver Improved*, 1653, p. 230.

Oade. Hall, E. Chronicle, Henry VIII, 1548, p. 200 (1809, p. 781).

Odde. Somerset Record Society, xx.

Ode. Somerset Med. Wills, 1901, p. 322. W. Turner, *The Names of Herbes*, 1547, p. 40.

Oode. Somerset Record Society, xx.

Vaddum. MS., Br. M., Rot. Cott. ii, 14. N. S. B. Gras, *Early English Customs System*, 1918, p. 157.

Vuadde. Turner, *Herbal*, 1568, ii, p. 11.

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Waald.[1] MS., Br. M., Add. Roll, 40739. Gras, l.c., p. 193.
Wad. *Names of Herbes* (E.D. Soc.), 1548, p. 40.
Wada. MS., R.O., K.R. Customs, 98/16. Gras, l.c., p. 652.
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Wade. ? Gerarde, *Herbal*, Harris, p. 7.
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Wisda. MS., R.O., K.R. Customs, 193/3. Gras, l.c., p. 214.
Wiseda. T. Stapleton, *De Antiquis Legibus*, 1846, p. 30.

[1] Gras regards this as a form of 'Woad'. But it more probably stands for 'weld', *Reseda luteola*, a famous dye plant. Cf. *Century Dictionary*.
[2] Gras puts against this (woad?).
[3] Probably = woad, although the editor of the Records regards it as = weld.

Wod.	P. Studer, *Port Books of Southampton*, 1913, p. 31.
Woda.	MS., R.O., K.R. Customs, 124/14. Gras, l.c., p. 168.
Wold'.[1]	MS., R.O., K.R. Customs, 193/10. Gras, l.c., p. 175.
Wold(e).[2]	P. Studer, *Port Books of Southampton*, 1913, pp. 100, 92.
Wood.	Act 4, Henry VII, c. 10.
Woode.	MS., R.O., K.R. Customs, 98/16. Gras, p. 654.
Woð.	Somerset Record Office, xx.
Wovode.	MS., B.M., Add. Roll, 40739; Gras, l.c., p. 193.
Wysda.	MS., R.O., K.R. Customs, 193/3. Gras, l.c., p. 214.

E. DIALECTS OF 'WOAD'

A few words may be added on the dialects of 'woad', by which are meant the local varieties of the word that differ from the standard or literary language. Such dialects may preserve traces of original linguistic form not incorporated in the standard language of the country. The following account is largely based on Wright's well-known Dictionary, to which readers are referred for further details.[3]

The geographical area over which dialects of woad are met with includes Scotland, Cumberland, Westmorland, Yorkshire, Lincolnshire, Northamptonshire, East Anglia, Wiltshire, and Dorset. Of special interest is the form 'wad' which occurs in the Lake district as well as in Yorkshire, Northamptonshire, and Anglia. 'Wood' is met with in Galloway, the north country, north

[1] Gras regards this as a form of 'Woad'. But it more probably stands for 'weld', *Reseda luteola*, a famous dye plant. Cf. *Century Dictionary*.

[2] Dr. Studer regards 'wold(e)' as a variant of 'wōad'.

[3] J. Wright, *English Dialect Dictionary*, 1905. C. B. Plowright states that 'woad' has been called 'wad' by the woad-grower in the Fenlands since 1243. Cf. *J. British Archaeological Assoc.* ix (1903), p. 97.

Yorks., Dorset, and Wiltshire. 'Wud' ('wod', 'wad') survives in Galloway.

1. An interesting phrase is met with in which fingers that are blue with cold are described 'as blue as wad', i.e. very blue. Thus in Cumberland, Westmorland, and East Anglia is heard the expression 'Peur (poor) lal (young) thing, its fingers er as blue as wad wi cauld'.

2. Several compounds are met with in which the element 'wad' occurs.

(1) Woad-croft. In Kettering a property is still called Wadcroft, and is so described in title-deeds.

(2) Woad-grounds. Within recent memory there were 'wadgrounds' in Hardingstone near Northampton, and in some neighbouring villages.

(3) Woad-men. Men engaged in the cultivation are called 'wadmen'.[1]

(4) Woad-wax or -wex is a term applied to the two plants known as dyer's broom (*Genista tinctoria*)[2] and to the needle whin (*Genista anglica*).

(5) Woad-wash or -wish.

(6) Woad-wise.

[1] *Victoria History of Somerset*, ii, p. 421.

[2] This plant yields a yellow dye, but was formerly used with woad to produce a green dye. (Johnson and Sowerby, *Useful Plants of Great Britain*, 1862, p. 69.)

CHAPTER XVIII

THE DEATH OF A GREAT INDUSTRY

IN the preceding pages the story has been told of a great industry which filled an important place in the economic life of Europe during the Middle Ages. Its ramifications extended far and wide, contributing to the prosperity of numerous communities, affecting international relations, and frequently calling for the interference of the legislature. In the halcyon days of woad no industry or trade appeared to be more firmly established or to have a more prosperous and stable future before it.

To-day this widespread industry has perished after a prolonged death struggle. A rival commodity of tropical origin, supplemented by an artificial dye manufactured in the chemist's laboratory, has struck the ancient industry a mortal blow, from which there is not the remotest prospect of resuscitation.

The subject will be discussed under the following headings:

A. THE COMPETITION OF INDIGO.
B. LOSS OF OVERLAND TRADE.
C. NEGLECTED CULTIVATION OF WOAD.
D. THE THIRTY YEARS' WAR.
E. ATTEMPTS AT RESUSCITATION.
F. DEATH OF THE WOAD INDUSTRY.
G. THE LAST DAYS.

A. THE COMPETITION OF INDIGO

The discovery of the new route to India *via* the Cape in 1560 and the development of America as a dye-exporting country were the essential causes which made

possible the importation of tropical indigo into Europe, in commercial quantities and at reasonable prices, and eventually led to the triumph of the exotic over the indigenous blue dye.

As early as 1563 the exotic indigo was being regularly imported into European countries, while the rapid increase in its consumption may be inferred from the fact that the Stotternheim Company at Erfurt in 1617 purchased indigo to the value of £1,950, and this at a time when the use of the foreign dye had already been prohibited, and when the company was only allowed to trade in woad. In 1631 seven Dutch ships imported 580,345 lb. of indigo into Europe, a freight that was worth over five tons of gold. Two years later, i.e. in 1633, three Dutch ships brought over £300,000 worth of indigo (2,046,00 Reichstaler).[1]

No doubt the legislation that was passed in various European countries about this period (cf. Ch. xvii) prohibiting the use of exotic indigo as well as of other newly discovered dyes, succeeded in checking temporarily the importation of indigo. Patriotic feelings doubtless also created a prejudice in favour of the home-grown product.

In spite, however, of penal legislation, the lower cost and the more vivid colour of the tropical product gradually won the day and the use of woad rapidly declined.

Such a powerful industry as that of woad, however, backed by strong financial interests, was not allowed to collapse without strenuous efforts to keep it alive. The death struggle between the two combatants extended

[1] F. Lauterbach, *Der Kampf des Waides mit dem Indigo*, 1905, p. 65, where many further details will be found.

over many years, showing the entrenched position of the industry, especially in those countries where it was cultivated. In one camp were arrayed the forces of capital and vested interests, national loyalty, time-honoured prejudice, experience extending over centuries, virulent abuse and misrepresentation, the dread of replacing a known dye by an unknown one; in the other camp were arrayed the forces of progress, the claims of artistic superiority and unquestioned economy.[1]

The sequence of events was not exactly the same in every country although in broad outline there was much similarity. The following narrative relates more particularly to Germany and especially to Thüringia, where the woad industry at one time formed the basis of the economic life of the country. When that industry collapsed, a large population whose livelihood depended on woad was plunged into abject poverty. We may now deal briefly with various factors that brought about the collapse.

B. LOSS OF OVERLAND TRADE

One reason for the decay of the woad industry in Germany may be found in the fundamental changes that took place in European commerce during the 16th century, the changes being largely due to the loss of overland trade from the East. Instead of the ancient land routes through Persia, Asia Minor, and central Europe, the Indian and Atlantic Oceans became more and more the arteries of traffic, and as a result the

[1] The economy effected by using exotic indigo instead of woad is shown by the fact that 4 lb. of the former yielded as much dye as a bale of woad, weighing *c.* 210 lb. On the other hand, if the very best woad was used 15 lb. would go as far as 1 lb. of exotic indigo. (*The Art of Dyeing*, tr. by Hellot, Macquer, and D'Apligny, 1901, p. 30.)

advantages which Germany and other central European States derived from the previous overland routes were seriously affected. Germany consequently passed through a period of severe economic depression, and this depression extended to the commerce in woad, large quantities of which had hitherto been exported both to Flanders and to England.

Further, for the same reason the home consumption of woad greatly diminished. One barrel of woad now sufficed to dye much more cloth than was used formerly. In the 14th century one barrel of woad was consumed in the dyeing of two cloths; in the 15th century one barrel dyed three cloths; early in the 16th century one barrel dyed six to eight cloths; while in the middle of the 16th century as many as twelve cloths were dyed with one barrel of dye. In the impoverished state of the country cheapness rather than quality was now aimed at, and a slump in woad naturally followed. A further reason for the reduced demand was that England was now cultivating larger supplies at home, and consequently imported less German woad than formerly.

Lastly, about this period were introduced various new dyes, such as sumach and logwood, all of which yielded dark colours, which enabled the dyers to dispense in some measure with woad, especially for the cheaper qualities of cloth. In brief woad became a glut in the market, with the natural result that its price sank more and more, until the profits of the woad-grower fell to about one quarter of what he formerly earned.

C. NEGLECTED CULTIVATION OF WOAD

This impoverishment of the woad farmers brought other evils in its train, such as an impaired quality of

the woad placed on the market. The tedious but essential process of cleaning the plants was neglected, all sorts of weeds being allowed to choke the good seed. Some farmers actually mixed thistles and burdocks with the woad leaves, and dispatched this fraudulent mixture to the woad mills to be crushed and kneaded into balls, and this adulteration was done with such skill that its detection was wellnigh impossible. For a time these dishonest practices increased the profits of the woad-grower. But future retribution was inevitable, when the merchants discovered and refused to buy such adulterated woad, which lost its previous high reputation and thus smoothed the way for the easier introduction of the rival dye which the farmers tried so hard to exclude.

Even apart from these questionable practices the woad itself was allowed to deteriorate both in quality and in quantity. Every crop, if continually cultivated on the same ground, tends to degenerate, and, in the case of woad, which has been grown in the same fields for several centuries, much of the land has become woad-sick. Modern research has taught husbandmen how to counteract such exhaustion, but in olden times scientific manuring was unknown.

This exhaustion of the woad fields, coupled with the destitution of the woad-growers was therefore an additional factor which favoured the competition of indigo.

D. THE THIRTY YEARS' WAR

The Thirty Years' War (1619–48) was a national calamity which did untold injury to the rural districts of Germany. Wherever the wild soldiery penetrated the

woad farmer was ruined. His homestead was burnt, his crops were destroyed, and many of his labourers were compelled to enlist, even when they were not, as often happened, cruelly put to death.

When the peace of Westphalia was concluded in 1648, it was difficult to restock the villages of Thüringia with a peace-loving agricultural population; still harder was it to feed it. Capital was scarce, especially amongst the agricultural community. Who can wonder if under such conditions the woad farmers of pre-war days could do little towards a resuscitation of the old industry?

E. ATTEMPTS AT RESUSCITATION

In spite of such adverse conditions, however, some rich Electors made gallant attempts to resurrect the former woad industry. Thus the Elector Frederick William of Brandenburg did his utmost to re-introduce the cultivation of woad in his territory; the Elector of Saxony did the same in Thüringia. Even in the district of Luneburg strenuous efforts were put forth in the same direction. Frederick William I of Prussia gave strict orders that woad was to be cultivated in the neighbourhood of Halle and Magdeburg. The same applied to Strasburg, New Brandenburg, and Soldin. In Silesia the tenant farmers occupying the fields owned by the State were strictly bound by their leases to sow three bushels of woad a year on every small holding, and six bushels a year on every large holding, as well as to prepare in good time for the harvesting of the precious woad crop.

In brief, the whole German nation seems to have been obsessed with the necessity of resurrecting the wealth-producing woad industry which for so many years had

enriched the entire community. Even the services of literature were invoked to assist in the campaign. One writer urged that good wages and nourishing food were essential to the prosperity of a people, and that for this reason all commodities as far as possible should be produced at home.

Another publicist taught that 'it was better to pay two talers (3*s*.) for a commodity that was produced at home than one taler for a commodity that had to be imported. The importation of foreign goods ought therefore to be immediately and entirely prohibited, without waiting until a trade in them had been established.'

Even foolish and short-sighted doctrines were promulgated by writers who sought to aid the nation, even at the cost of misrepresentation. Here is a striking example: 'Germany possesses an abundance of black dye-stuffs such as the oak, alder, and vitriol;[1] it possesses woad for blue, various herbs for yellow as well as madder for red. . . . Indigo, therefore, ought long ago to have been prohibited, since it was a mere weed from the dyer's point of view. Indeed if it were really required it could easily be grown at home!'

Strenuous efforts to revive the woad industry were also made by means of tempting prizes. Frederick the Great and Joseph of Austria promised high rewards for the discovery of a method of extracting indigo from woad.[2] The Royal Society of Science at Göttingen also offered a prize about the middle of the 18th century for an improved process of producing woad dye. Francis I presented 5,000 florins (£500) to Dr. Heinrich in Plön

[1] The term 'vitriol' formerly included the sulphates of iron, copper, and zinc.

[2] E. Bancroft, *New England Book of Dyes*, 1815, p. 346.

(in Bohemia), in order to defray the cost of his researches.

Prof. Green in Halle (Saxony) announced positively that he had succeeded in extracting indigo out of woad at a very low cost, while von Resch after careful experiments declared that an indigo of as good a quality and as cheap as the tropical indigo could be extracted from woad. Indeed, according to von Resch's researches,[1] the production of indigo produced from woad only cost *c.* 3*s.* 6*d.* per lb. (1 Taler and 6 Groschen), and this at a time when the price of foreign indigo was *c.* 15*s.* per lb. (5 Talers). It was said that even in unfavourable years indigo could be extracted from woad at a remunerative price, and that by this means the enormous sums which every year were sent abroad and spent on foreign indigo might be retained in the country.

F. DEATH OF THE WOAD INDUSTRY

These various efforts to resuscitate the woad industry proved a complete fiasco, while the pretended discovery of commercial methods of extracting indigo from woad was nothing more than the baseless fabric of a dream. Imported indigo gained an ever firmer foothold in the dye market, so that at last even the stoutest supporters of woad succumbed to a deep pessimism.

Strange to say, the loss of the valuable woad industry was even attributed to the neglect of religion in Germany. Thus Luther's words, although written *c.* 1533, were applied to the woad industry: 'When God punishes a country, he not only diminishes the number of inhabitants, but he also deprives them of the fruits of

[1] A. von Resch, *Der Ausländische Indigo und das Surrogat desselben, der Waid-Indigo*, 1811, pp. 62 f.

the earth. For example, in our own days both Italy and Thüringia, once the most fertile district of all Germany, have grown less fertile, so that seven years nowadays only yield as much produce as three years used to do. This is due to the sins of mankind, especially to the prevailing habits of usury and avarice; these sins exhaust and exploit the country to a grievous extent.'[1]

In one of the Tischreden, 1533, Luther definitely refers to woad, and attributes its failure to the ill use made by the farmers of their wealth:

'Erfurt has been a very fruitful Bethlehem. But the land has been ruined by woad, so that the blessing has turned into a curse. The Talers have spoilt the farmers; God will give them Talers and deprive them of corn; the result will be hunger and want.'[2]

Schreber also, writing in 1752, regarded the death of the woad industry as a well-merited divine retribution. 'God in His great mercy and love for mankind has decreed the temporary loss of woad, so as to bring man back to himself and a state of true happiness.'[3]

A leading statesman actually wrote: 'Even the wisest regulations have failed to save this jewel of Thüringia. When God for His own reasons wishes to withdraw the blessing that He has lent to a country for a time, we can do nothing but submit.'[4]

We have dealt somewhat fully with the causes of the death of the woad industry in Germany as our knowledge of the various factors is more complete than it is in the case of other countries. Everywhere, however, the more vivid colour and the lower price of the exotic

[1] M. Luther, *Werke*, xliv (1915), p. 658.
[2] M. Luther, *Werke: Tischreden*, iii (1914), p. 45.
[3] D. G. Schreber, *Beschreibung des Waidtes*, p. 134.
[4] Schreber, l.c.

indigo gradually gained the victory over the indigo extracted from the European woad plant. This was the main factor that operated in the Toulouse and Somme woad districts of France, in the Florentine woad district of Italy, as well as in the various woad districts in this country. In all these countries doubtless much capital disappeared and many rich woad merchants lost their all. The woad industry was doomed.

G. THE LAST DAYS

A few words may be devoted to the last days of the famous industry, which had played so important a part in the economic life of Europe. 'Ichabod' may well form its epitaph.

As regards France the cultivation of woad was for practical purposes extinct by the 18th century, only to be suddenly and temporarily resuscitated under the exigencies of the Napoleonic wars, as has been already described (p. 112). As all the importation of exotic indigo into France and the adjacent countries had been stopped by the continental blockade, a strenuous effort was made to obtain indigo from woad, and Napoleon issued a Decree, giving orders that woad should be cultivated over the whole of France, as well as in Germany as far as the Elbe.

For a time glowing reports of the successful extraction of indigo from woad were published. From a commercial point of view, however, such extraction proved a total failure, and the fall of Napoleon not long after, together with the concurrent economic and political changes, brought the last serious attempt to resurrect the woad industry to an ignominious end.

Time's effacing finger and the vandalism of man have

obliterated almost all the memorials of a once flourishing industry. Only a few traces have lingered on to modern times. In France the town of Bischweiler in Alsace so recently as 1825 still possessed four important dye-works, with eight woad vats, while Wasselnheim in 1834 still retained a small woad mill.[1]

One of the latest crops of woad was grown in 1883, in the Tarn department, where three hectares were cultivated. The very last woad field seems to have been planted in 1887 at Cannevière near Alby.[2]

In Germany the industry survived until the middle of the last century, and in three Thüringian towns, Erfurt, Gotha, and Langensalza, woad was still cultivated on a small scale as recently as 1865.[3] The last surviving woad mill, situated in the village of Pferdingsleben near Gotha, was pulled down in 1910.[4] The woad industry, once described as the 'golden fleece of Thüringia', had come to an end.

England can still boast of some scanty remnants of her ancient industry, thanks to an insistent demand for some woad to be used for promoting fermentation processes in the woad-indigo vat, as has been described in Ch. x. Two surviving woad farms serve to keep alive the memory of a remarkable industry which during many generations had contributed to the economic prosperity of the country.[5]

[1] G. Hegi, *Flora von Mittel-Europa*, iv (1), p. 199.
[2] M. Muff, *L'Agriculture du Tarn*, 1926, p. 50. In the Tarn department there were no less than 300 woad mills in the 18th century.
[3] *Deutsche Real-Encyclopädie*, 1868, xv, p. 241. [4] Hegi, l.c., p. 199.
[5] But even as this work has been going through the press the fate of these last British woad farms has trembled in the balance; and unless a national effort is soon made to prevent this their extinction will ensue. (A. R. H.)

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II. SPECIMENS OF WOAD IN THE HERBARIUM AT KEW[1]

THE distribution of *Isatis tinctoria* L. will be best understood if the treatment of the species by Rouy and Foucaud is first of all studied. These authors make four forms of it with sub-varieties:[2]

1. **I. tinctoria** L. (*sensu stricto*) (*L. tinctoria* var. *sativa* DC.). Fleurs grandes, silicules glabres, ovale-elliptiques, presque aussi larges à la base arrondie qu'au sommet, courtes.
2. **I. campestris** Stev. Feuilles glabres. Fleurs petites, silicules glabres, oblongues, plus ou moins atténuées à la base.
   var. *b. hirsuta* Rouy et Fouc. *I. tinctoria B. hirsuta* DC. *I. Villarsii* Gaud. (No. 8 in Nyman.)[3] *I. alpina* Vill. *non* All. Silicules glabres, souvent apiculées au sommet (sub-var. *apiculata* Jord.). Feuilles velues.
   var. *c. villosa* Rouy et Fouc. (*I. canescens* Lamotte), silicules velues, plante plus ou moins pubescente.
3. **I. canescens** DC. (*I. tinctoria* var. *canescens* Grenier et Godron.) Plante pubescente ou velue; fleurs petites; silicules pubescentes, tomenteuses ou velues cunéiformes—allongées, grandes, longuement attenuées au sommet, larges et tronquées à la base.
4. **I. oxycarpa** Jord. Plante glabre, fleurs petites; silicules glabres, cunéiformes—allongées, petites, ordinairement apiculées.

The following is a summary of the specimens of woad at Kew arranged geographically under each species.

EUROPE

1. Isatis tinctoria

BRITISH ISLES. Sellack, Hereford; Hog's Back, Wanborough, Compton, Shalford near Guildford, Tatsfield, Surrey (sub *I. glauca*, but really *I. tinctoria*,

[1] For this summary I am indebted to the Director of the Royal Botanic Gardens, Kew.

[2] Rouy et Foucaud, *Flore de France*, 1895, ii, pp. 99 f.

[3] Cf. Bibliography, p. 297.

British Isles (cont.)	and one small piece *I. campestris* Stev. var. *hirsuta* Rouy et Fouc.). Ramsgate, Kent. Norfolk,[1] St. David's, Fife; Haddingtonshire; cliffs near the Severn, Tewkesbury (thought to be the only 'native' station); Wandsworth, Guildford, Surrey; Bembridge, I. of Wight.
FRANCE.	Briançon, Hautes Alpes, Rocher St. Jacques, Audelys, Carpentras.
GERMANY.	Glogau, Posen.
ITALY.	Parma.
RUSSIA.	Ukraine, Odessa, Crimea, Karasubazar, Burultscha.
SPAIN.	Castille.
SWITZERLAND.	Lausanne, Savoy.
TURKEY.	Rumelia.

2. Isatis campestris Stev.

RUSSIA.	Ukraine.

I. campestris Stev. var. *hirsuta* Rouy et Fouc.

FRANCE.	Polliat, Ain, Gourdon, Grasse, Bar, Puy Crouël, Clermont, Gatiers, Le Havre, Bourg-Madame. Corsica, St.-Pierre de Venacco, Plombières, Briançon, Hautes-Alpes, Bordeaux.
GERMANY.	Schwarzwald.
GREECE.	Thessaly, Pharsala.
SPAIN.	Albacete, Riópar.
BALKANS.	Dalmatia, Comissa, Bosnia.
HUNGARY.	Roumania, Transylvania, Obrowitz, Brünn.
SWITZERLAND.	Leuk, Valais, Vaud, Devens près Bex. Einfischthal.

I. campestris Stev. var. *villosa* Rouy et Fouc.

FRANCE.	Lozère de Saly, Savoy, Moutiers.

3. Isatis canescens DC.

FRANCE.	'*Circa* Telonem' (Toulon), Var, La Palud, Provence, Basses Alpes.

[1] The specimens from 'Norfolk' to 'I. of Wight' are in the Watson Herbarium.

GREECE. Mt. Malevo, Laconia, Hajos Petros, Mt. Parnes, Attica, Peninsula Hagion Oros, Mt. Athos, Stratidochi, Thessaly.

BALKANS. Dalmatia, Cattaro, Spalato, Bosnia, Rini, Mioce Rudo.

ITALY. Lucania, Pignola, Sardinia, Sicily, Bronte, Piana dei Greci, Monreale, Palermo, Mt. Etna.

RUSSIA. Crimea, Karasubazar, Burultscha.

SPAIN. Mt. Cana, Riopar.

4. **Isatis oxycarpa** Jord. (unrepresented)

SCANDINAVIA. *I. maritima* Rupr.
Holm, Rosen, Ölandia, Morby, Ostrogothia, Olskir.

RUSSIA? *I. taurica* MB. One specimen Coll. Besser.

ASIA

I. tinctoria L., of the narrow fruited, *I. campestris* or *I. canescens* types.

AFGHANISTAN. Kurrum Valley, 'Cat's Filth', ranges up to 11,000 feet from Kurrum to Seratigah (employed as a dye-stuff, native name Rangowah 'the dye'), in flower all summer, common in dry water-courses; Otipore fields, Hanab valley.

I. tinctoria L. Caria.

ASIA MINOR. *Isatis canescens* DC.
Armenia, Thutaza to Arzani.
I. campestris Stev. var. *hirsuta* Rouy et Fouc.
Armenia, Gumusch-khane.
I. taurica MB.
Armenia turcica, Sipikordagh, Erzinghan.
Isatis campestris Stev. var. *stenocarpa* Boiss. Mt. Sipyle, Magnesia.
I. glauca Boiss.
Armenia, Erzerum, 6–6,200 feet, Zara, Wilajet Siwas, Kharput, between Günütschair and Pekenik.

Asia Minor (cont.)	Galatia, Angora.
	Cappadocia, Haaden.
MESOPOTAMIA.	Shergit.
PERSIA.	Azerbeidzan, Tabriz.
	var. *collina* Boiss.
	Kurdistan, Pir Omar Gudrun.
	I. tinctoria L.
CHINA.	Margins of wheat fields, Lang-Kong Valley, north-west Yunnan, Mo-so-yu, Chu Yuan, Is. Sachalin, Tjyengtai, Corea, near Soul (north China), near Thoei Lien, coll. by Purdom (north China), as 'Chinese Woad', west Thibet.
INDIA.	North-west Frontier, Abaqui, Upper Chenab, Chitral, Drosh.
JAPAN.	Satsu Kari, Prov. Oshima, Hokkaido, Mombetsu, Côte de Urakawa.
NORTH ASIA.	No specimens in Herb. Kew; but cf. Ledebour, *Flora Rossica*, 1842, i, p. 212.

AFRICA

MOROCCO.	*Isatis tinctoria* L.
	var. *virens* Cosson.
	Djebel Ouensa, south of Morocco.
	Dj. Afougueur, Dj. Bouachfel, Demnat, Dj. Takreda.
	(See J. Ball, *J. Linn. Soc.* xvi (1878), p. 336.)
	var. *laetevirens* Ball.
	Atlas Region, Tizi Hemiri, Amsmiz, Dj. Takreda, Revaia.
TROPICAL AFRICA.	I. *praecox* Kit., Angola.
	Isatis tinctoria L. (I. *campestris* var. *hirsuta*).
ATLANTIC ISLES.	Canaries, Hiero, San Pedro.
	Azores, St. Michael, St. Mary, Madeira, Bracisica.
	I. praecox Kit. (?=var. of *I. tinctoria*).
	Madeira, used for dyeing (see Lowe, *Flora of Madeira*).
	Boa Nova, between Machico and Caniçal.

III. AGREEMENT BETWEEN THE CITIZENS OF NORWICH AND THE WOAD MERCHANTS OF AMIENS AND CORBIE, A.D. 1286[1]

SINCE of late a dispute had arisen between Nicholas le Mouner, Peter Cokerel, John Fruyter, Firmin Cokerel, Peter le Mouner and Ralph le Mouner, merchants of Amiens and Corbie, complainants on the one part; and Adam de Toftes, Roger de Morleye, William But and Geoffrey de Bungeye, Bailiffs of Norwich and other citizens of the same city, defendants on the other part; because the said Bailiffs and the other citizens required from the same merchants of Amiens and Corbie for every bale of woad four pence, for every cask of woad four pence, for a frael of woad four pence,[2] for every barrel of ashes two pence[3] and for every measure four shillings. And because they sold their woad by the coomb[4] and by the bushel and ashes by the barrel, and their wold[5] by the stone.[6] This dispute however was settled on Saturday the feast of the Apostles Peter and Paul [29th June] A.D. 1286 and in the 14th [year] of the reign of King Edward, the son of King Henry, by the grace of God King of England, in this manner. Viz. that the aforesaid Bailiffs of Norwich and the other citizens of the same city, for them and for their heirs, granted to the aforesaid merchants of Amiens and Corbie and to all other merchants coming from the said towns to the City of Norwich with their merchandise named above, that it be freely permitted to them to make their bales of woad there by rendering to the Bailiffs of the said city for every bale of woad four pence only, for every barrel of ashes two pence only. And if they shall have brought the woad in fraels, they shall render to the Bailiffs of Norwich for every frael four pence

[1] W. Hudson and J. C. Tingey, *Records of the City of Norwich*, 1910, ii, pp. 209 f. This volume contains the Agreement in Latin as well as this translation.

[2] A frael is probably 25 lb.

[3] Probably wood ashes from which the alkali potash used in dyeing was extracted.

[4] A dry measure of four bushels.

[5] Or weld *Reseda luteola*.

[6] It is possible that this procedure was regarded as retail trading and gave rise to the quarrel.

only. They also granted to the same merchants that, if they shall have brought the same merchandise into the said city, it is permitted to them to sell their woad by the coomb and by the bushel, and ashes by the whole barrel, and their wold by the stone, to whomsoever they will, whether foreigners or natives, so that the said Bailiffs may exact nothing from the same merchants for their measures of woad or for the said sale. And also they granted to the same merchants that they may carry away their said merchandise thus brought in at their will, and sell it to any one else they will, provided that no one of them buys the same merchandise so brought in from another, unless they are willing to take away the same by the whole bale without the city, and to places distant further than ten leagues from the City of Norwich, by giving to the Bailiffs of the aforesaid city the customs right and due therefrom. And that they might dwell within the same city so long as they please.[1] And the aforesaid merchants oblige themselves and all other merchants of Amiens and Corbie, bringing the aforesaid merchandise to the City of Norwich, to give to the Bailiffs of the same city, who stand for the time being, 40s. per annum at the Nativity of the Lord [25 Dec.], and to the community of Norwich, or to their certain attorney, 40s. per annum at the nativity of St. John the Baptist [24 June], submitting themselves to the distraints of the aforesaid Bailiffs if it happens that they make default in the said payment at the said terms. They also granted that if the said merchants, all or more, may not come to the said city with the aforesaid merchandise, and one from the said towns shall come, he shall be compelled to make payment of the said four pounds in the manner abovesaid by the said Bailiffs or to fully perform the customs, concerning which the dispute first arose, which they confess themselves to perform by right, as the same Bailiffs and citizens of Norwich think is more advantageous to themselves. In witness of which thing the seals of the aforesaid

[1] The usual time of residence allowed to foreign merchants was forty days. The attempt of the city of London merchants to enforce this regulation may have driven the foreign woad merchants away from that city. (*Liber Albus*, ed. by H. T. Riley, iii, p. 167.)

merchants of Amiens and Corbie, and the seal of the community of Norwich are alternately appended to this writing composed in the form of an indenture. Dated on the day aforesaid in the time of Sir Salomon de Rochester, Sir Richard de Boyland, Sir Walter de Sterchesle, Master Thomas de Sodinton, Sir Robert de Fulton and Sir Walter de Hoberton, Justices Itinerant of the Lord King then at Norwich. Witnesses, Sir William de Kerdeston, Sir John de Verdun, Sir William de Redham, Sir Richard de Belhus, Sir William de Gyneye, Sir Ralph Malherby, and Sir William de Cringelthorpe, Knights, and many others.

IV. BRISTOL ORDINANCES RELATING TO THE CRAFT OF DYERS, INCLUDING CHARTERS GRANTED BY KING HENRY IV AND KING HENRY V, AND LETTERS PATENT MADE BY KING HENRY VI

OATHS TAKEN BY WOAD BROKERS AND WOAD PORTERS [1]

Ordinances for Woad, in the time of
John Wycombe, Mayor (1347?)

FIRST it is ordained and agreed that every burgess of Bristol who has woad, be it a tun or more, that it be lawful to every burgess to break his own woad if he will. And if the said burgess wish to have the porters who are ordained and appointed by the Mayor and Commonalty, to wit 8 or all the porters, that the burgess pay for the tun of Picardy woad 3d., for breaking it and making ready the woad to receive its turn.

Also it is ordained that the said porters ought not to take for the tun of Toulouse woad more than 6*d*. for breaking it, and for making ready the said woad to receive its turn.

Also it is ordained, that if the sworn porters break a tun of woad of any burgess or be present when it is broken, that they

[1] These documents have been extracted from *The Little Red Book of Bristol*, ed. by F. B. Bickley, 1900, i and ii, some of the less important sections being omitted on the ground of space. The oaths of the woad brokers and woad porters have been translated from Anglo-Norman into English. These documents illustrate the development of guild life in the 14th and 15th centuries.

take for each turn of each tun a farthing; and if the porters aforesaid be prevented by the said owner who will not suffer that they be at the breaking of the said woad that then they ought to take for each turn of each tun a halfpenny.

Also it is ordained that the porters be ready to make the three turns of each tun of woad as well of those which are prevented by the burgesses as of those which are broken by the said porters.[1]

Also at the fourth turn that the said porters be ready to store the said woad by view of the brokers sworn to that office. And if the porters aforesaid or any of them refuse to execute or perform the ordinances or any of the points aforesaid when they shall be reasonably warned by the party and by the brokers, and know well that the thing ought to be done, and do not do it, and of that be convicted, that there be levied and paid to the Commonalty from the goods and chattels of the said porters half a mark, and to the party for his damages 20*s*.

Also it is ordained that if the brokers of woad[2] be not at the three turns when they are made by the porters aforesaid as they are sworn; and also when the woad is put in store; and also if the said brokers do not execute legally what pertains to their office that they pay to the Commonalty half a mark, and to the party for his damages 20*s*.

Also in case the porters do not and will not execute their office in due manner as is aforesaid that it shall be quite lawful for the mayor to put other suitable men in their place to perform the said office and to remove the said porters.

And in case the said brokers do not and will not execute their

[1] Woad was frequently imported in the form of dry balls, which were broken up into small pieces and then subjected to fermentation. This is the breaking process alluded to.

During fermentation the entire heap was turned over three or four times, so that the bottom layer came to the surface, each separate operation being called a 'turn'.

[2] At Southampton brokers appear to have dealt in all kinds of merchandise and not merely in one commodity such as woad. They were also enjoined to 'prefer the profit of the burgesses'. (P. Studer, *The Oak Book of Southampton*, 1910, i, p. 139.)

office as is aforesaid it shall be quite lawful to the mayor to put others in their place and to remove the said brokers.

Also that no broker take from any burgess, vendor or buyer, any money for any kind of merchandise except what each burgess will give of his own good will.

Also it is ordained that if any burgess cause to be stored woad amounting to more than a tun without view of the brokers and the porters, and of that be convicted by the said brokers and porters that he pay to the Commonalty 40*s*.

Also that no merchant, alien or stranger, cause to be stored in the town, without paying a fine to the Mayor and Commonalty, any woad coming to Bristol as well by water as by land.

Also it is ordained and agreed that no alien or stranger cause any woad to be broken within the town of Bristol except by the porters who are sworn to the said office.

Also it is ordained that the said porters do not take for the breaking of a tun of Picardy woad more than 4d. and for a tun of Toulouse woad 8*d*. from strangers and for making it ready to receive the turn.

Also it is ordained that the porters of aliens and strangers for each turn of each tun receive $\frac{1}{2}d$. and that they make their turns well and legally and put them in store cleanly. And if the said porters refuse to execute their office in any point that they pay to the Commonalty half a mark when the merchants complain and it be testified to by the brokers.

Also it is ordained that if any alien or stranger cause [woad] to be stored within the franchise without the porters and brokers being present, and of this they be convicted by the said brokers and porters that he pay to the Commonalty 100*s*., so that the merchants may be warned of the aforesaid penalty.

Also it is ordained that now after the storing is done and the assay made by sworn dyers the merchant, be he alien or stranger, sell the said store within the 40 days next following, and if he do not so he shall incur the aforesaid penalty.

Also that no alien or stranger ought to sell any kind of woad to any other stranger within the franchise, nor ought any other burgess for them or in their name by collusion and deceit of

the Commonalty on pain of losing all the woad so bought and sold.

Also that each alien and stranger ought to pay to the brokers for every tun that he sells to a citizen 12*d.* and no more for their brokerage. And if the merchant sell by quarters to the citizens that he pay to the brokers for the quarter 2*d.* and no more.

Also if any merchants, alien or stranger, wish to complain of any broker or porter that they do not execute their office properly, that is to say, to witness loyally between merchant and merchant, as also between citizen and stranger, and make loyal turns and loyal storage, and if they do not act as broker or porter should and of that be convicted, that they pay to the Commonalty half a mark.

NOTE FOR THE DYERS

WHEREAS within these times grievous losses happened to divers people of the town of Bristol for their woad which has been put in working by certain dyers roving through the town, who have put in working the said woad in various vats in several places at once, so that the dyer cannot give his attention to all at one time, whereby through want of care the woad has been lost, it is ordained by Richard Lespicer, then Mayor of the abovesaid town, with the assent of all the good people of the same, that no such dyer at any time that he shall have put any vat of woad in working undertake to put any other in working within the franchise of the town, so long as the vat which he has put in working is open or full. And if any one do so and be convicted thereof let him pay to the Commonalty half a mark each time that he be convicted thereof. Also it is ordained that if any other dyer of the town undertake to work in his own house the woad of any one, after it has been assayed, the woad be forfeited, the dyer be bound to restore to the owner as much as the woad cost, and that the money be levied from the goods and chattels of the dyer by coercion and distress of the mayor and his officers for the time being.

Also that the dyer undertake to put [in working] any woad

within the franchise aforesaid until it be assayed by the assayers on pain aforesaid.[1]

FOR THE CRAFT OF THE DYERS IN BRISTOL

THESE are the petition, ordinances and articles which are granted and confirmed to the masters, burgesses of the craft of dyeing of the town of Bristol, in the time of John Droys, Mayor of the same town, John Fissher, &c. [1407].

To the honourable and discreet Sirs, the Mayor, Sheriff and Bailiffs of the town of Bristol, and to all the honourable men of the Common Council supplicate the said masters (*altered from* supplicate your poor and simple co-burgesses all the dyers of the same town). Whereas certain persons of the said town of diverse crafts, knowing nothing of the art of dyeing, and who have never been apprentices or masters of the said craft, take on themselves divers tasks and bargains of dyeing the cloths and woollens of the several people of the same town and of the country round about, the which cloths and woollens have divers times been badly dressed and worked through their ignorance and want of knowledge to the great injury of the owners and scandal of all the craft aforesaid, and to the drapery of the same town. Wherefore very wise sirs may it please your special grace to grant to the said suppliants the underwritten ordinances in order to take away and annul all deceits and damages which hereafter can arise in the craft aforesaid, and this for God and as a work of charity.

First let it be ordained and assented that two masters of the said craft be elected annually by common assent of all the masters of the said craft in the town of Bristol, and their names presented to the Mayor of Bristol in full court of the Guildhall of the same town and there to be sworn on the Holy Gospels within the quinzaine of Michaelmas at the latest to survey well and loyally all manner of defaults which henceforth shall be committed as well in dyed cloths as in wools put in woad within the franchise of Bristol. And if any damage is done to any person through defect of dyeing by any man or woman of the

[1] *The Little Red Book of Bristol*, ii, pp. 38–40.

said craft that then he shall pay sufficient recompense to the parties injured according to the discretion of the said two masters and of four other indifferent persons elected by the Mayor and his council, as the offence demands.

Also insomuch as often before now divers men as well those who have not been apprentices, servants or masters of the said craft, as others who are of other crafts, not knowing nor having knowledge of the aforesaid craft of dyeing have taken on themselves to dye cloths and woollens put in woad as well of the good people of the town as of the country round about, the which cloths because of bad management and through lack of knowledge of the said men are greatly impaired of their colours and have many other defaults to the great loss and damage of the owners of the said cloths and to the great scandal of the town and shame of all the craft aforesaid, whereby the masters and apprentices of the said craft of dyeing are vagrants through want of work, because the said men of other crafts have been occupied in their said craft to their great mischief and undoing, Wherefore it is ordained and assented that henceforth no man of the said craft nor of any other craft undertake to dye any cloth or wool unless it be presented by the said masters that he is good, and able and sufficiently learned in the said craft on pain of paying to the Mayor and Bailiffs of the chamber for the use and common profit as is before said, for the first default 6*s*. 8*d*., for the second default 13*s*. 4*d*., for the third default 20*s*. and for each default after the said three defaults 20*s*., without any pardon, so that the said masters have for their work the third part arising from the said defaults for their light, provided always that all the burgesses of this town may make their profit for dyeing their own cloths in their own houses as has been used hitherto, these ordinances notwithstanding.

And after view of the said petition and ordinances aforesaid by the Mayor and Common Council it was assented that all the masters of the said craft of dyeing living within the franchise of Bristol ought to come before the Mayor to hear their said ordinances, and whether they will assent to and grant the same or not. And by command of the said John Droys, Mayor of the

same town, Ralph Dyer, Robert Wethir, Richard Marche, John Symondes, John Hore, William Oldebery, William Court, John Meke, Robert Dyer, Roger Dyer, John Hathewey, John Slugge, Walter Gibbes, Ralph Willond, John Scarlet and several others of the aforesaid craft came in their own persons, to whom all the said ordinances were published and declared, and every of them in presence of the Mayor aforesaid granted and assented to all the ordinances and penalties aforesaid, praying of their common assent, that the ordinances and penalties aforesaid be of record ratified, confirmed and enrolled in the papers of the Guildhall of Bristol and be put in due execution for ever, saving always to the jurisdiction of the Mayor and of the Common Council of the town of Bristol.

Provided also that the dyers aforesaid are bound by these ordinances to make assay of the woad and to work wools and cloths as well in woad as in madder of the goods of all the merchants and burgesses of Bristol, providing for their work reasonably as has been the custom and use before this. In witness whereof to these at the special prayer and request of the said masters for guarding and maintaining their ordinances aforesaid we have put the seal of the office of the Mayoralty of the town of Bristol. Given in the Guildhall of the same town the 17th day of March, the eighth year of the reign of King Henry IV after the conquest (1407).

OF THE TIME OF WILLIAM CODDER, MAYOR, IN THE THIRTY-FIRST YEAR OF HENRY VI (1452–3)

CHARTER OF THE LORD (KING) HENRY IV MADE TO THE DYERS OF BRISTOL OF DIVERS ORDINANCES FOR THE CRAFT OF DYERS, ETC.

Henry, by the grace of God, King of England and France, and Lord of Ireland, to all to whom these present letters shall come, greeting. We have inspected a certain writing of ordinances resolved on for the better government of the craft of dyers of the town of Bristol put forward by John Drois, late Mayor of the said town, John Fissher late Sheriff, James Cokkes and

David Dudbroke, late Bailiffs of the same town, by the advice and assent of all the Common Council of the aforesaid town and the assent of the good men of the said craft, sealed with the seal of the mayoralty of the town aforesaid, in these words:

'These are the petitions, etc. (*ut supra*). Now we accept, approve and by the tenor of these presents grant and confirm the writing and ordinances aforesaid as ratified and approved, for us and our heirs so far as in us lies, as the writing and ordinances aforesaid reasonably testify. In testimony whereof we have caused these our letters to be made patent. Witness me myself at the Castle of Saltwood, the 7th day of March, the 13th year of our reign [1412].'

CHARTER OF THE LORD (KING) HENRY V MADE TO THE DYERS OF BRISTOL CONCERNING THE LIBERTIES OF THEIR CRAFT

HENRY, by the grace of God, King of England and France and Lord of Ireland, to all to whom these present letters shall come, greeting. We have inspected the letters patent of our very dear lord and father Henry late King of England made in these words:

'Henry by the grace of God, etc. We have inspected a certain writing etc. (*ut supra*). Now we accept, approve, ratify and now to the dyers of the aforesaid town and their successors by the tenor of these presents we grant and confirm the letters aforesaid and all and singular the things contained in them, holding them as ratified and approved, for us and our heirs so far as in us lies, as the aforesaid letters reasonably testify. In testimony whereof, etc. Witness myself at Westminster the fifth day of April, the 1st year of our reign [1413].'

The inspeximus of the Charter of King Henry IV.

LETTERS PATENT OF THE LORD (KING) HENRY VI MADE TO THE DYERS OF BRISTOL OF THE FOREGOING, ETC.

HENRY, by the grace of God, King of England and France and Lord of Ireland, to all whom these present letters shall come,

greeting. We have inspected the letters patent of our very dear lord and father Henry late King of England made in these words:

'Henry, by the grace of God, King of England and France and Lord of Ireland, to all whom these present letters shall come, greeting. We have inspected a certain writing of ordinances resolved on for the better government of the craft of Dyers of the town of Bristol. . . . These are the petitions, etc. We accept, approve, ratify and now to the Dyers of the aforesaid town and their successors by the tenor of these presents grant and confirm the aforesaid letters and all and singular the things contained in them, holding them as ratified and approved for us and our heirs, so far as in us lies, as the aforesaid letters reasonably testify. In testimony whereof, etc. Witness myself at Westminster, the 30th day of January, the 3rd year of our reign [1425]. Joce, Common Clerk.'

The inspeximus of the Charter of King Henry IV.

THE OATH OF THE WOAD BROKERS (*t.* Edw. III)

We swear that we will be faithful etc. We will see that the woad porters duly carry out the usual three turns of the woad and afterwards put it into store. We will not permit any sample of strange woad to be offered for sale or sold in this town or placed in store, unless it has been properly turned over three times. Nor will we suffer any stranger to sell woad to another stranger in the town without duly warning the Mayor or the other officials of the fact. We will also carefully record any covenants that are made between any private merchants and strangers. Lastly, we will neglect not any of the duties pertaining to our office, but will perform them faithfully, so help us God, etc.[1]

THE OATH OF THE WOAD PORTERS (*t.* Edw. III)

We swear that we will be faithful and loyal etc. We will carry the woad when we are ordered to do so by the brokers and will

[1] *Little Red Book of Bristol*, ed. by F. B. Bickley, 1900, i, p. 54.

faithfully turn over the woad three times as in duty bound, and afterwards place it in store. We will also carefully measure it. We will interfere with no other persons but will duly carry out our own duties. We also will faithfully perform all else that belongs to our offices, so help us God, etc.[1]

[1] *Little Red Book of Bristol*, ed. by F. B. Bickley, 1900, i, p. 55.

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[1] As this chapter is so full of variants of woad, these are not indexed, but only those cited elsewhere than in Ch. xvii.

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